

Playing the Odds

This is the first installment of a column directed toward intermediate programmers. As you gain experience and begin to tackle larger programming projects, there are a number of problems and issues you'll have to solve. My goal then is to discuss these issues, which often arise when writing larger, more complex programs. I also hope to point out some common strategies for dealing with problems.

Although much of the discussion in this column will tend to be aimed at programmers working with C or assembly language, the same issues arise in BASIC and many other languages. Hopefully the techniques presented here will be useful to you as well. In addition, beginning and advanced users should find food for thought here.

To start, let's take a look at a topic that many people programming in BASIC and C take for granted (and that many assembly-language programmers consider quite mysterious): random numbers. As it turns out, generating random numbers need not be mysterious at all. But it should be taken seriously.

What are Random Numbers?

The longer you think about the subject

of random numbers, the more complex it becomes. Let's clarify what we mean by random numbers. It should be apparent that no computer program can generate truly random numbers, since anyone who knows the method being used can (at least in theory) predict the exact sequence of "random" numbers. For this reason, we should really be referring to such numbers as *pseudo-random numbers*.

It should also be apparent that the random properties we want are actually properties of the sequence of numbers, not of any one number itself. So when we attempt to generate "good" pseudo-random numbers, we should think of a list of consecutive numbers produced by our method, and consider properties this list of numbers should have. Some of these include:

- ☛ Uniform Distribution — this is really just a fancy way of saying that no number should appear much more often than any other (i.e., the list shouldn't be "loaded").
- ☛ Long Cycle — it isn't hard to prove that any reasonable method will eventually repeat itself. Ideally, this should only happen after a very long time.
- ☛ Uncorrelated — this means that there should be no apparent connection between one number and the next. As an example, if our pseudo-random number generator just returns 1, 2, 3, 4, etc., then it does satisfy our first two conditions but still can't be considered very random.

The last of these three requirements is by far the most technical, requiring a strong knowledge of statistics to analyze. Most supposed random-number generators fail the second requirement. Odds are that if you write a pseudo-random number generator without a good theoretical understanding, the sequence you get will eventually settle into a very short cycle. Clearly, the numbers 2, 27, 342, 2, 27, 342, 2, 27, 342, etc., cannot be considered random.

The point of all this is that you shouldn't try developing your own method of generating random numbers unless you really know what you're doing. In *The Art of Computer Programming*, Donald Knuth summarizes this by emphasizing that "random numbers should not be generated with a method chosen at random." A specific example of this trap is when people try to make numbers more random by randomly listing a bunch of numbers. Such efforts are almost always counterproductive, resulting in a less random sequence that takes longer to generate.

So How Do You Do It?

Despite the theoretical complexity, there

are several highly effective means of generating random numbers. These techniques have been extensively analyzed, are known to produce good results and are quite easy to program. The simplest is the *linear congruential generator*, which we'll look at here. This routine typically requires only one multiplication and one addition for each new number. To implement this using 16-bit arithmetic, we start with a seed number, then generate the next random number in the sequence using

```
seed = (13849 * seed + 25173) mod 65536
```

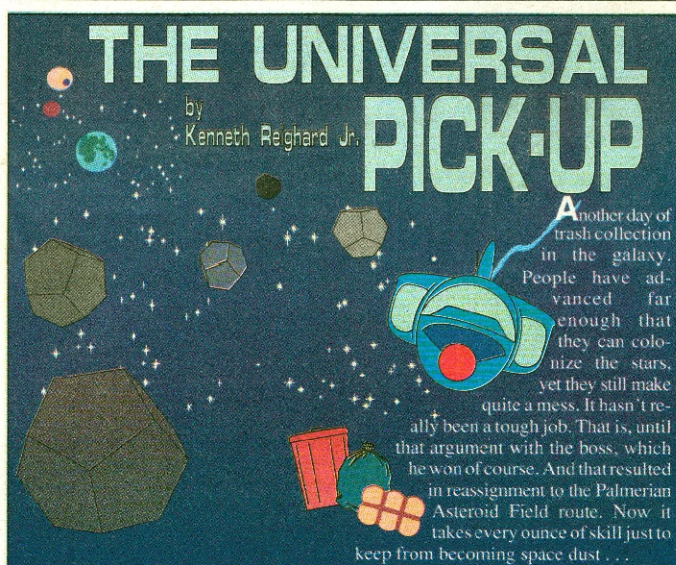
Notice that the mod 65536 part simply becomes "ignore the overflow" if we're

using 16-bit arithmetic. The two values 13849 and 25173 are not chosen at random; they satisfy a number of requirements that help guarantee the resulting sequence will have appropriate properties. Despite the simplicity of this method, it performs quite well and should be more than adequate for all but the most sophisticated statistical applications.

In 6809 assembly language, the linear congruential method can be implemented by setting aside a two-byte value for the seed, then using the subroutine *rand* shown in Figure 1. If you don't have much experience working with multiple-precision multi-

SEE ODDS ON PAGE 16

Feature Program



Another day of trash collection in the galaxy. People have advanced far enough that they can colonize the stars, yet they still make quite a mess. It hasn't really been a tough job. That is, until that argument with the boss, which he won of course. And that resulted in reassignment to the Palmerian Asteroid Field route. Now it takes every ounce of skill just to keep from becoming space dust...

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LETTERS

Kudos

Editor:

Well, it's time to renew my subscription to THE RAINBOW, and it's the only bill I don't mind paying. It may be true that the number of pages in THE RAINBOW has decreased, but I believe the quality of the content has steadily increased.

Perry Friesen

Box 1743

High Level, AB T0H 1Z0

Canada

Thanks! We needed that.

Looking for a Source

Editor:

I have a 128K Color Computer 3 with a CM-8 monitor, a single-drive FD-502, a DMP-132 printer and a CCR-81. Could you please send me a list or catalog with all of your software and equipment for the Color Computer 3?

James Kinney

731 St. Martin

Cahokia, IL 62206

THE RAINBOW is the catalog, of sorts, for Color Computer hardware and software. If you see something you want, you simply contact the specific advertisers offering that item. We know of no other "catalog" for CoCo products.

The Compleat CoCo 3 Manual?

Editor:

I am looking for a complete, detailed, yet easy-to-understand manual explaining the CoCo 3. I need a simple guide telling me just what this computer will and won't do, and what it can and can't be connected to. Please tell me where I can write to order such a book.

R. Melanson

71½ Mecklenburg

St. John, NB E2L 1P9

Canada

To the best of our knowledge, there is no single complete guide to using the CoCo 3. The manual that comes with the computer provides all you need to know about its general use (connecting it to a television or monitor, running programs, etc.). The biggest resource available for your Color Computer is back issues of THE RAINBOW. Here you will find hints, in-depth articles, programs, answers to technical questions and more. January back issues usually follow a "beginner" theme and include several how-to articles you might find helpful.

How 'bout It, Folks?

Editor:

I enjoy reading THE RAINBOW and look forward each month to receiving the new issue. I have been a subscriber since January 1987, and many articles in the magazine have been "launching pads" for programs I have written.

A few months ago I purchased OS-9 Level II. Shortly after that I upgraded to 512K RAM and added a second disk drive. Since then I have entered nearly all the OS-9 programs I have found. There are, however, some noteworthy utilities that I cannot enter because OS-9 Level II does not come with an assembler. Three that come to

mind are Dsort (March 1988, Page 186), Nice (March 1990, Page 96) and Find (March 1992, Page 27). Would it be possible to print an article in your magazine that presented these programs in the form of BASIC09 programs that generate the executable files (i.e., MakeDsort, MakeNice and MakeFind)?

I realize that space is at a premium in THE RAINBOW. However, there would be no need to include explanations for the listings. Simply provide references back to the issues in which the original programs appeared. I am sure there are many readers who, like me, would be grateful for these and other programs they could enter and use.

Clinton Huber

2727 Neff Road East

Regina, SK S4V 1X7

Canada

Wants Astronomy and Ham Software

Editor:

I am new to the Color Computer world and have just bought a 512K CoCo 3, two disk drives, two RGB monitors, two printers, and a bunch of software. I also have a 128K CoCo 3 and a 64K CoCo 2.

I am looking for programs dealing with the subjects of astronomy and amateur radio. I know there are many of these types of programs for the IBM and also the Macintosh, but I haven't been able to find anything for the CoCo.

I also have back issues for 10 years of THE RAINBOW. I have read them but didn't find anything that would help me. Perhaps another RAINBOW reader can help me?

Bud Helck

1127 Perry Avenue

Bremerton, WA 98310

Needs More Spreadsheet Power

Editor:

I have been a subscriber to THE RAINBOW for many years, and I own quite a bit of software that I have purchased for my CoCo 2 and CoCo 3 through ads in your magazine.

I am the treasurer for an investment club, and I use VIP Calc to create all my financial reports. However, this is a very troublesome process. Can anyone recommend a higher-performance spreadsheet for the CoCo?

I also bought OS-9 Level II, and I have not been able to work with it.

Ghislain Renaud

640, rang des Sables

Chabard, PQ G0W 1G0

Canada

In terms of features, VIP Calc supports most of those available with any other Color Computer spreadsheet program (though the graphics-screen update is a bit slow). Given more information about your exact needs and what the problem is, perhaps we (or a reader) could offer helpful suggestions for reducing the trouble you are encountering.

Wants a Standard Environment

Editor:

I want to use the env.file that comes with Multi-View on some of my custom system-masters disks. How can I be sure the env.file is being read? Would adding something to my startup file help?

Ernest Bazzinotti, Jr.

91 Huggins Road

Rockland, MA 02370

Multi-View includes a built-in routine that reads the environment file when you start Multi-View. This is not part of the OS-9 system itself; OS-9 does not provide support for an environment setup of this nature. This cannot be changed simply by installing a call to env.file in your startup file. On the other hand, OS-9 automatically knows how much memory you have, and drivers are loaded for all the disk drives and other devices. Specific changes (e.g., selecting an RGB monitor instead of composite) are handled through external commands.

Going Once, Going Twice...

Editor:

I have an extra FD-502 disk system (without cable) that I am willing to part with if anyone needs one. I'm making it available as separate parts (drive, case and power supply, and controller).

I'm also forming a CoCo users group in the Pottstown/Allentown/Reading area. All you need to join is a CoCo, one program to contribute to the library, and an intense interest in the CoCo Community.

Ryan Boughter

176 Henry Road

Barto, PA 19504

See the letter from Adam Tiday in this issue. He is trying to locate a new drive system, and perhaps you could help him out.

Needs a New Drive

Editor:

My FD-502 disk drive is no longer working. I'm looking for a new one, but I'm having a lot of trouble finding a seller. Can you help?

I'm also looking for the Peeks, Pokes 'n Execs series of books from Microcom Software (mentioned in the August 1991 issue, Page 13). Could you tell me where and for how much I could get them?

Adam Tiday

499 Hill Top Road

York Springs, PA 17372

Adam, see the letter from Ryan Boughter in this issue for information on a replacement disk-drive system. As best we can tell, no vendors are currently selling the Peeks, Pokes 'n Execs series from Microcom.

Where's the Memory?

Editor:

Does anyone make (or have plans to do so) a memory-expansion board for the CoCo 3 that uses the 256K SIMMS Macintosh users are discarding in droves as they upgrade to 4MB and beyond? It seems to me a perfect opportunity for someone to develop such a board that takes advantage of these relatively inexpensive 256KB and/or 1MB SIMMS. If anyone has information on this subject, please contact me at the address below.

It also saddened me to learn THE RAINBOW is now available by subscription only. For some time I have purchased the first copy available at my newsstand. It looks like I'll have to get a gift subscription for my brother-in-law (he bought my CoCo 3 when I defected to the Macintosh world). My kids still have a CoCo 2, and one of my coworkers bought my venerable CoCo I. In addition, my daughter loves the GUI that TCE's Child Writer uses.

Alan Routier

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Indianapolis, IN 46227

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THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, 9509 U.S. Hwy 42, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, enter RA1 to get to the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, enter LET to reach the LETTERS> prompt, then select Letters for Publication. Be sure to include your complete name and address.

Zippy Animation

In BASIC?

by Joseph Pendell

I've always wanted to use 3-D rotating graphics programs but found them too complicated; it sometimes seems that you need a doctorate to figure out what numbers to enter in order to generate the graphics. I decided it was time to make things simpler, so I wrote *I-Spin*. After you enter the program and run it, you'll see a large letter I spinning in the center of the screen; and you don't have to enter any numbers to get it to work.

When I was considering how to approach writing *I-Spin*, I at first thought it would be next to impossible to create rotating graphics with BASIC. After all, there are a lot of calculations to perform for each movement the figure makes. So I designed *I-Spin* to take care of all the calculations beforehand. During the display part of the program, the only job the computer has to perform is that of drawing the graphics images.

Program Notes

Line 270 contains six pairs of x and y values, corresponding to points in Cartesian coordinates. These coordinates define the endpoints of the lines required to draw a capital letter I. Lines 120 through 250 read these data points, converting them to polar

coordinates. This is done to simplify rotation of the image.

Once the coordinates are in polar form, the points are transformed back into Cartesian coordinates; however, the values of their angles are changed, thus producing rotated coordinates. The new points are then stored in two-dimensional arrays, X and Y (lines 260 through 400). Each of these arrays has two indices, the first of which determines which of the 64 rotations (see Line 30) the figure is in. The second index differentiates between the six line endpoints.

Modifications

Enough with the technical stuff — here are some practical ways to modify *I-Spin*. Consider using the high-speed poke (POKE 65497, 0 for the CoCo 3, POKE 65495, 0 for the CoCo 1 or 2). While the movement is already pretty quick, it is amazing to see this BASIC rotation at high-speed. Don't forget to slow the computer down, however, before any disk or tape I/O (POKE 65496, 0 for the CoCo 3, POKE 65494, 0 for the CoCo 1 or 2).

Another simple modification is to change the figure size. To do this, change the value 5 in Line 100.

As written, the figure rotates in the

counter-clockwise direction. To make it turn clockwise, change Line 470 to

```
470 FOR I=RES-1 TO 1 STEP -J
```

Let's change the figure. To see a rotating triangle instead of the letter I, make the following line changes:

```
40 NUMPOINTS=3
```

```
270 DATA 0,15,-10,-15,10,-15
```

```
500 LINE(X(I,1),Y(I,1))-(X(I,2),Y(I,2)),PSET
```

```
510 LINE-(X(I,3),Y(I,3)),PSET
```

```
520 LINE-(X(I,1),Y(I,1)),PSET
```

For another quick modification, try changing Line 480 to

```
480 C=C+1:IF C=16 THEN C=0:PCLS
```

There are several other changes I've

experimented with. For instance, to get the fastest rotation possible, use PMODE 0 instead of PMODE 1. You'll lose some of the resolution, but it'll move quicker. Or rewrite the data to draw a clock hand. You could even carry this to the point of creating your own CoCo grandfather clock. A final suggestion is to make the center of the rotating object move, producing a rolling effect. It will take some work, but it can be done, and the effect is well worth the effort.

Joseph Pendell has a degree in electrical engineering from the University of Maryland. In addition to programming the Color Computer, Joseph enjoys using the Macintosh. His hobbies include riding skateboards and playing Super Nintendo.

CoCo 3

The Listing: ISPIN

```
1 'I-SPIN
2 'BY JOSEPH PENDELL
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
30 RES=64
40 NUMPOINTS=5
50 DIM R(NUMPOINTS)
60 DIM TH(NUMPOINTS)
70 DIM X(RES,NUMPOINTS)
80 DIM Y(RES,NUMPOINTS)
90 PI=2*ATN(1E10)
100 MOD=5
110 'GET COORDINATES AND MAKE POLAR
120 FOR I=1 TO NUMPOINTS
130 READ X,Y
140 R(I)=MOD*SQR(X*X+Y*Y)
150 IF X<0 THEN TH(I)=0
160 'SPECIAL CASE ANGLES
170 IF Y=0 THEN TH(I)=0
180 IF Y>0 THEN TH(I)=PI/2
190 IF Y<0 THEN TH(I)=3*PI/2
200 GOTO 250
210 TH(I)=ATN(Y/X)
220 'ACCOUNT FOR DIFFERENT QUADRANTS
230 IF X<0 THEN TH(I)=TH(I)+PI
240 IF X>0 AND Y<0 THEN TH(I)=TH(I)+2*PI
250 NEXT I
260 'X,Y COORDINATES FOR ROTATING FIGURE
270 DATA -10,15,10,15,-10,-15,10,-15,0,15,0,-15
280 CLS
290 PRINT@,"SETTING UP GRAPHICS";
300 INC=2*PI/RES
310 BASE=0
320 'CALCULATE POINTS FOR ROTATE
```

```
D FIGURE
330 FOR DANGLE=0 TO 2*PI STEP IN C
340 FOR I=1 TO NUMPOINTS
350 X(BASE,I)=128+R(I)*COS(TH(I)+DANGLE)
360 Y(BASE,I)=96-R(I)*SIN(TH(I)+DANGLE)
370 PRINT";";
380 NEXT I
390 BASE=BASE+1
400 NEXT DANGLE
410 'START THE SHOW!
420 PMODE 1.1
430 PCLS
440 SCREEN 1,0
450 PMODE 1.3
460 FOR J=1 TO 4
470 FOR I=0 TO RES-1 STEP J
480 PCLS
490 'CONNECT POINTS
500 LINE(X(I,1),Y(I,1))-(X(I,2),Y(I,2)),PSET
510 LINE(X(I,3),Y(I,3))-(X(I,4),Y(I,4)),PSET
520 LINE(X(I,5),Y(I,5))-(X(I,6),Y(I,6)),PSET
530 PCOPY 3 TO 1
540 PCOPY 4 TO 2
550 NEXT I
560 NEXT J
570 GOTO 460
```

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Feature Program

Sort Directories

with BASIC09

by KEN KOBES

L sometimes find it hard to keep up with my OS-9 directories since entries are never in alphabetical order. In short directories this isn't a big problem, but in directories with many entries... well, confusion reigns. Having seen a directory-sorting utility on my father's PC compatible, I decided to write one for the CoCo using BASIC09—*SortDir* is the result.

Flow for the program is fairly straightforward: read the directory entries, sort them and rewrite them. The source code shown in the listing is commented to give some guidance.

Using *SortDir* is easy: Get BASIC09 running, enter and save the source code (or load it from disk if you've already entered it), then run it. *SortDir* prompts you for the path to the directory you want sorted. Once you enter this, the program goes to work.

Alternatively, to have *SortDir* ready all the time, pack it into the CMDS directory. Then you can enter *sortdir* at the OS-9 prompt (make sure *runb* is also in the current execution directory).

As written, *SortDir* sorts directories after temporarily converting all entries to lowercase. If you follow the standard OS-9 practice of naming subdirectories in uppercase and files in lowercase, you'll find directories intermingled with files instead of all bubbled to the top of the directory listing after you run *SortDir*. To change this, remove the two lines containing *LOR* statements at offsets \$04E9 and \$051C in the listing. The best way to do this is to change them to remark statements.

I believe you'll find this little utility is a big help when it comes to organizing your OS-9 disk files. I know I do!

Ken Kobes enjoys using the OS-9 operating system and programming his Color Computer in BASIC09. He can be contacted at 1107 Bingham Avenue, Sault St. Marie, MI 49783. Please include an SASE when requesting a reply.

NEW PRODUCT

Delmar Company recently announced the release of *DataDex* by J. Stephen Carville. This free-form data-management program for the OS-9/68000 operating system is designed to keep records in much the same way as a 3"-by-5" card file. *DataDex* does not require that users learn a database programming language. For more information, contact Delmar Company at P.O. Box 78, Middletown, DE 19709, (302) 378-2555.

OS-9

The Listing: SortDir.b09

```

PROCEDURE SortDir
0000 REM This procedure reads in a directory's entries
0030 REM and sorts them alphabetically. It then
005A REM rewrites the directory in alphabetical order
0089
009A TYPE rec=Entry(32):BYTE; SEntry:STRING[29]
00A5 DIM array(200):rec
00B3 DIM temp:rec
00BC DIM ByteRecord(32):BYTE
00CB DIM path:BYTE
00CF DIM zero:BYTE
00D6 zero:=$00
00DE DIM i,j,l:INTEGER
00ED DIM ErrNo:INTEGER
00F4 DIM DirName:STRING[80]
0100 DIM Swap:BOOLEAN
0107
0108 ON ERROR GOTO 200
010E PRINT CHR$(12)
0113 PRINT "*** Sort and Rewrite a Directory's Entries ***"
0143 PRINT
0145 PRINT "Enter Path to Directory to be Sorted"
0160 INPUT DirName
0172 PRINT
0174 PRINT "Reading Directory Entries";
0192 OPEN #path,DirName:READ+DIR
019E SEEK #path,64. \REM skip anonymous directory entries
01CE
01D5 WHILE NOT(EOF(#path)) DO
01E0 GET #path,ByteRecord
01EA IF ByteRecord(1)>0 THEN
01F8 i:=i+1
0203 array(i).Entry:=ByteRecord
0212 GOSUB 100
0216 PRINT ". ";
021C ENDIF
021E ENDWHILE
0222 CLOSE #path
0228 PRINT
022A
022B REM now sort the directory array on name
0252 REM using simple bubble sort
0260 PRINT "Sorting Directory Entries";
0288 REM preserve value in i by using l
02AC l:=i
02B4 Swap:=TRUE
02BA WHILE Swap DO
02C3 Swap:=FALSE
02C9 FOR j:=2 TO l
02DA IF array(j-1).SEntry>array(j).SEntry THEN
02F6 Swap:=TRUE
02FC temp:=array(j-1)
030A array(j-1):=array(j)
031C array(j):=temp
0328 PRINT ". ";
032E ENDIF
0330 NEXT j
0338 l:=l-1
0346 ENDWHILE
034A PRINT
034C
034D REM now write back sorted data to directory file
037C REM and set first byte of all unused entries to zero
03AF PRINT "Writing Directory Entries";
03CD OPEN #path,DirName:WRITE+DIR
03D9 SEEK #path,64 \REM skip anonymous directory entries
0405 FOR j:=1 TO l
0416 PUT #path,array(j).Entry
0427 PRINT ". ";
042D
0438 NEXT j
0438 WHILE NOT(EOF(#path)) DO
0443 SEEK #path,(i+2)*32
0453 PUT #path,zero
045D i:=i+1
0468 ENDWHILE
046C CLOSE #path
0472 PRINT
0474
0476 100 REM convert file name to all lowercase for sorting
04AA array(i).SEntry:=""
04B8 FOR j:=1 TO 29
04CB EXITIF ByteRecord(j)>127 THEN
04D7 ByteRecord(j):=ByteRecord(j)-128
04E9 ByteRecord(j):=LOR(ByteRecord(j),32)
04FB array(i).SEntry:=array(i).SEntry+CHR$(ByteRecord(j))
0518 ENEXIT
051C ByteRecord(j):=LOR(ByteRecord(j),32)
052E array(i).SEntry:=array(i).SEntry+CHR$(ByteRecord(j))
0548
0556 NEXT j
0556 RETURN
200 ON ERROR GOTO 300
0561 ErrNo:=ERR
0567 PRINT
0569 PRINT CHR$(7) \REM sound bell
057B PRINT "Error Number";
058C PRINT USING "i4",ErrNo;
0599 PRINT " has occurred"
05AA PRINT "***** Procedure Aborted *****"
05CB CLOSE #path
05D1 300 END

```

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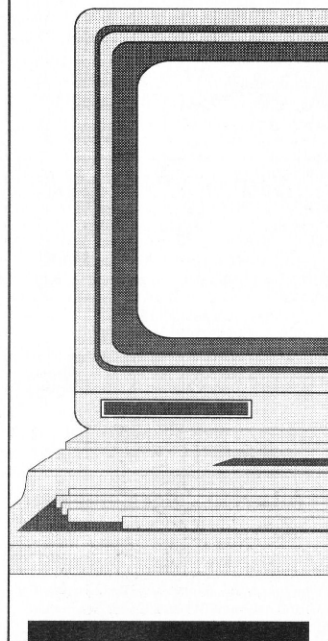
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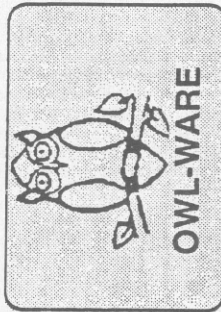
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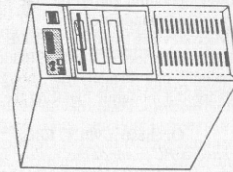
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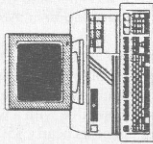
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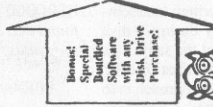
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**MARTY GOODMAN**

Easy 6309 Upgrades

Q Is there any easier way to replace a bad 68B09E with a good one (or to replace a 68B09E with a Hitachi 63B09E) than de-soldering the chip? Also, what have you heard concerning assemblers for use with the extended instruction set in the Hitachi 63B09E?

Dennis McMillan (COCOKIWI)
Pittsburg, California

A Chris Burke, developer of the PowerBoost software that takes advantage of the extra power of the 6309 and applies it to OS-9, has come up with a clever means of replacing the microprocessor in a Color Computer that does not require desoldering the old 68B09E chip. This works well in computers with working 68B09E chips where you want to add, switchably, a 6309. It is a very clever approach.

I'm not sure I can recommend this approach, though, in cases where the 68B09E is blown out because it's possible that the CPU was damaged in such a way that this technique will not work. Indeed, in cases where one has done this technique and has later fried the processor by jiggling or removing a Multi-Pak Interface or card with the power on, I would tend to recommend that any repair involve completely desoldering the original chip — just to get it out of the picture entirely. What follows is Chris Burke's procedure for adding a 63B09E. I must again emphasize that while this approach will work if you start with a working computer, I am concerned that you may have to rip out the entire modification and do a proper, complete replacement of the 68B09E if you ever blow out your computer.

- Cut Pin 39 (TSC) on the 6809, leaving a small piece sticking out of the processor so you can solder to it.
- Cut off pins 5, 6, 33, 36 and 38 from a 40-pin IC socket. Bend out Pin 39 so you can solder to it.
- Stack the 40-pin socket on top of the 6809. Solder all corresponding pins together. *However*, do not solder Pin 39 of the 68B09E to the socket.

At this point you have two options:

- Solder a wire from Pin 39 of the 6809 to +5 volts and another wire from Pin 39 of the socket to ground; or
- Solder a 4.7K-ohm resistor from Pin 39 of the 6809 to +5 volts and solder another 4.7K-ohm resistor from Pin 39 of the socket to +5 volts. Then take an SPDT (single-pole, double-throw) switch, connect the common contact to ground, connect one end of the switch to Pin 39 of the 6809, and connect the other end of the switch to Pin 39 of the socket.

In either case, finish up by plugging the 6309 into the socket. If you picked Option 1, you now have a 6309 system. If you picked Option 2, your system is now switch-

able between the 6809 and the 6309 (before power-up — not while running!).

Regarding your question about assemblers for the 6309, Bill Vergona of CerComp has just announced that he is well into making a working assembler for the 6309's extended instruction set. As I write this, he is in the process of puzzling out the last few details regarding some instructions that were not well-documented, and expects to have this assembler available as a commercial product in the not too distant future. I believe this will be a Disk BASIC-based product, but perhaps at some point he will arrange to have it ported to OS-9.

Modifying the Kitz EPROM Burner

Q I have a Kitz EPROM burner and want to burn 27128 EPROMs. However, my burner handles only V_{pp} voltages of 25 and 21 volts, and most 27218s I've seen require a 12.5-volt V_{pp} . Where can I get 27128 EPROMs that use 21-volt programming voltages?

John Gordon-Reid (TICTOC)
New York

A Early 27128s were made that used a 21-volt programming level, but all modern units require 12.5 volts. The last time I checked, the 27128 series of EPROMs was fairly consistently labeled as follows: Parts that have 27128 as their part number use a 21-volt programming level, and those that were numbered 27128A require 12.5 volts for programming. Most (but not all) 27128A parts also had written on them "Program at 12.5 volts." Thus, if you can get parts whose numbers are 27128 (and not 27128A), which do not say on them "Program at 12.5 volts," they will almost certainly be 21-volt type parts. Note that the above logic is *not* true for 27256 EPROMs. There, some of the parts labeled 27256 (no "a") require 21 volts for V_{pg} (such as some Fujitsu parts) whereas other 27256 (again, no "a") parts take 12.5 volts for programming!

The best approach is to modify your Kitz burner so that it supplies the required 12.5-volt V_{pp} . V_{pp} on the Kitz burner is set by simple circuit consisting of a zener diode and a resistor. The raw +27 volts from your three 9-volt batteries is fed into the resistor, and the resistor in turn connects to the cathode (the end with the stripe on it) of a zener diode, whose other side goes to ground. The zener conducts at a precise voltage, causing regulation to occur. The zeners for the 21- and 25-volt settings are chosen to conduct at close to those voltages.

You can add another zener diode in parallel with the existing zener that sets the 21-volt V_{pp} with a SPST (single-pole, single-throw) switch that connects or disconnects it from ground. This other zener must be chosen to conduct at around 12-volts. Radio Shack sells a 12-volt zener diode that might do the job. With this added zener switched in, your Kitz burner will, when jumped for 21-volts V_{pp} , supply 12.5 volts instead.

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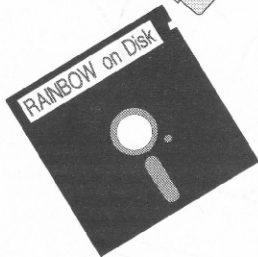
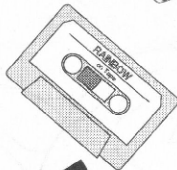
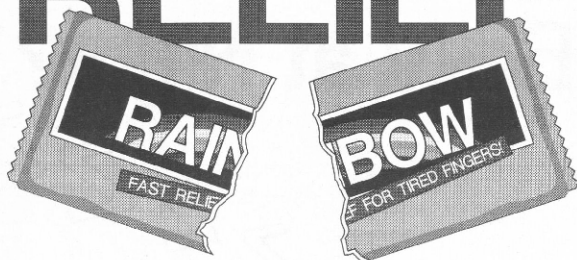
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You can check the voltage of the V_{pp} circuit using a simple volt meter to be sure you've got it right before you try it on an EPROM. Anything between 12.1 and 12.8 volts should work just fine. If you find yourself burning exclusively 12.5-volt EPROMs, you might want to modify your battery pack to use only two, not three, batteries to take a little strain off the 12.5-volt zener by dropping its input voltage from 27 to 18 volts.

Debugging the 6309

Q I'm writing an assembler for the 6309. The information I have concerning the AIM, OIM, EIM and TIM instructions is vague. I know these are meant to be analogous to similarly named instructions in the 6801's instruction set. In the documentation for the 6309 I got from Delphi, it lists these as three-byte instructions. But the opcode is one byte and a direct address is specified by only one byte, which makes two. So why do the docs lists these as three-byte instructions?

Bill Vergona (CERCOMPVILLV)
Las Vegas

A Art Flexser (ARTFLEXSER) replied to Bill's question on Delphi. Following is his response:

Bill, I did some experimenting with the 6309 in my computer, and here's what I think is going on: I believe the I in those four instructions stands for Immediate. A, O, E, and T stand for And, Or, Exclusive Or and Test, respectively. The M stands for memory and, yes, you are right, it is in Direct Addressing mode. Thus, the instructions are three bytes long, as your documentation says. The first byte is the opcode, the second byte is the Immediate Value, and the third byte is the Direct Address. Specifically:

- AIM #nn, \$aa means to AND the contents of \$aa with nn, then store the result in \$aa.
- OIM #nn, \$aa means to OR the contents of \$aa with nn, then store the result in \$aa.
- EIM #nn, \$aa means to EOR the contents of \$aa with nn, then store the result in \$aa.
- TIM #nn, \$aa means to AND the contents of \$aa with nn, then TST the result without changing the contents of \$aa.

Note that you might want to play a bit with TIM; I am not absolutely certain I've got that one exactly right. But if I'm not right, I'm probably quite close. Good luck on your work on the 6309 assembler!

Faster Chips, Faster Computer?

Q What exact phrase do I use when ordering memory chips for a 512K memory board? Will a CoCo 3 run any faster if I replace the 120ns 41256 chips in my 512K upgrade with 70ns 41256 chips?

Dan Holly (DANHOLLY)
Frankfort, Kentucky

A When ordering memory chips for a CoCo 3 512K memory board, you should specify that you want 16-pin, 256Kb-1-bit dynamic RAM chips (generically known as 41256 chips) rated at 120 nanoseconds. Your CoCo 3 will most likely run OK if the chips are rated at 150, 100, 80 or 70ns; but I suggest, if you can get them, you specify 120ns. These chips typically cost anywhere from fifty cents to a dollar each if you buy them from chip salvagers used; they may run a buck to a buck fifty or so each if you buy prime, new parts.

The answer to whether buying faster chips will make your CoCo 3 actually run faster is no. The speed rating of the chips (given as an access time in nanoseconds)

indicates the fastest speed at which the chips are capable of operating. However, the speed at which they actually operate is determined not by their access time but by the system clock of the computer in which they are installed. The CoCo 3's system clock is fixed by the crystal and GIME chip on the motherboard. Changing to faster DRAMs will in no way change the speed of the rest of the system.

You can't speed the CoCo 3 system by changing the crystal without seriously messing up other aspects of the CoCo 3, such as its video synchronization and software baud rates because those are tied to the same crystal within the GIME chip. In fact, empirical reports indicate that 120ns chips often work slightly better than faster rated chips, especially in CoCo 3's with 1-Meg upgrades. If true, this would be explained by very subtle aspects of the internal timing of the chips. Similarly, I have heard reports of 512K CoCo 3's that replacing 150ns chips with 100ns chips has resulted in the DRAM running much cooler. However, what is happening in those cases may not be related to the rated access time but to some other subtle timing difference between the different brands of chips used.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGOP of THE RAINBOW's CoCo SIG. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

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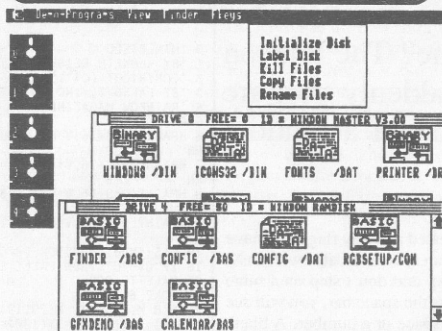
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- Disk Library files up to 9 levels deep.
- Supports standard Motorola directives.
- Allows multiple values in FCB/FDB directives.
- Allows assembly from Buffer, Disk or both.

Specify Coco 1, 2 or 3 Disk \$59.95



Window Master V3.0



The Ultimate User Friendly Point & Click operating System for your Coco 3. Simple enough even for children to use, just point and click to run programs, select files, do disk or file maintenance or almost any

task you currently do by typing commands. You also get things like a print spooler, Programmable Function Keys, a Buffered Keyboard,

Ramdisk, Serial I/O port and Deluxe Pak support along with Windows, Icons, Buttons, Pull Down Menus, Edit Fields and Mouse functions all in one program. It has multiple fonts in 54 possible sizes and styles, Enhanced Basic Editing and much much more. It add over 50 commands and Functions to Basic to fully support the Point & Click System without OS9.

"...it offers so many features that it is probably underpriced. I recommend this software to all CoCo3 owners." -The Rainbow February 1989

It is completely compatible with existing Basic programs and takes absolutely no memory away from basic. It requires 1 Disk Drive, R.S. hires interface & Joystick or Mouse.

Includes 128 & 512K
Versions Only \$69.95

"The Source"

The SOURCE will allow you to easily and quickly Disassemble machine language programs directly from disk and generate beautiful, Assembler Source Code. And "The Source" has all the features and functions you are looking for in a Disassembler.

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Coco Tools is a comprehensive disk utility Program providing the most complete set of functions available for the standard R.S. DOS disk system. Comparable in scope and functionality to that of the famous utility available for MS-DOS computers "PC-TOOLS"!

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Cer-Comp Ltd.

5566 Ricochet Avenue

Las Vegas, NV 89110

702-452-0632

PICK-UP CONTINUED FROM COVER

Oh, no! There's another one. Turn quick and grab the trash. Dodge another asteroid. Look out! Aaaaagh...

Interplanetary Trash Collector is a game in which you are the pilot of a supercharged garbage scow assigned to a route smack in the middle of an asteroid field (be nicer to the boss next time). Your job is to successfully pilot your ship through the field, attempting to pick up the red trash bins without smacking into the side of an asteroid. Steer your ship using the four arrow keys on the CoCo-driven console of the ship.

Because of a redesign in garbage scows, you are able to collect trash bins simply by running over them. However, the redesign depleted funds originally intended to go toward the correction of a serious flaw in your ship's construction: Your ship leaks radioactive waste. For this reason, if you steer the ship across its own path (the blue trail onscreen), you'll be destroyed.

When you first run *Interplanetary Trash Collector* you are asked to enter a skill level between 1 (lowest) and 50 (highest). The chosen skill level exactly corresponds to the number of trash bins available for pickup. Should you be successful and collect all the trash bins on one screen, the next screen is automatically set to the next highest skill level.

Interplanetary Trash Collector is designed to be run on a CoCo 3. However, a

few simple changes are all it takes to allow the program to run on a CoCo 1 or 2: First change Line 600 to

```
600 POKE 65495,0
```

and change POKE 65496,0 in Line 470 to POKE 65494,0. Then change Line 605 to

```
605 CLSO
```

and delete Line 606.

If you are using a CoCo 3 with a composite monitor, replace RGB in Line 605 with CMP. This should make the screen colors accurate.

Finally, remember that *Interplanetary Trash Collector* uses the high-speed mode. If you exit the program using the BREAK key, make sure you slow the computer down by entering POKE 65496,0 (POKE 65494,0 for CoCo 1 and 2 users) before performing any tape or disk I/O.

Ken Reighard Jr. is studying computer science and engineering at the University of Toledo, where he is also a member of the Triangle fraternity. He can be contacted at 2F441 Ridgeland Drive, Toronto, OH 43964, (614) 537-4875. Please include an SASE when requesting a reply.

CoCo 3/32K Extended

The Listing: IPTRASH

```
1 'INTER-PLANETARY
2 'TRASH COLLECTOR
3 'BY KENNETH REIGHARD, JR.
4 'COPYRIGHT (C) 1992
5 'BY FALSOFT, INC.
6 'RAINBOW MAGAZINE
7 GOTO 600 'TITLE SCREEN
14 ' SCREEN SET UP
15 S=0
20 PMODE 1.1:PCLS 2:SCREEN 1.0:C
OLOR 4,2
40 FOR Q=1 TO INT(SK/2):A=RND(25
0):B=RND(187):CIRCLE(A,B),6.1:PA
INT(A,B),1,1:NEXT Q
45 FOR Q=1 TO 190+INT(SK/2+5):PS
ET(RND(255),RND(191),1):NEXT Q
50 FOR Q=1 TO SK
60 A=RND(243)+7:B=RND(179)+7
90 IF A<18 AND B<18 THEN A=18:B=
18
100 FOR Z=(A-6) TO (A+12) STEP2:
FOR ZZ=(B-6) TO (B+12) STEP2:IF
```

```
PPOINT(Z,ZZ)=4 THEN 60 ELSE NEXT
ZZ,ZZ
110 LINE(A,B)-(A+6,B+6),PSET,BF:
PLAY"T255L25503BCDF"
115 NEXT Q
120 LINE(0,0)-(16,16),PRESET,BF
130 PLAY"T203P4L8BCBCBC"
140 X=0:Y=0:H=2:V=0:SS=0
143 ' START MAIN GAME LOOP
145 PSET(X,Y,3)
150 QS=INKEY$
160 IF QS=CHR$(8) THEN H=-2:V=0
170 IF QS=CHR$(9) THEN H=2:V=0
180 IF QS=CHR$(10) THEN H=0:V=2
190 IF QS=CHR$(94) THEN H=0:V=-2
200 X=X+H:Y=Y+V:S=S+2
210 IF X<0 OR X>255 OR Y<0 OR Y>
191 THEN 240
220 ON PPOINT(X,Y) GOTO 230, 145
, 240, 250
221 ' END MAIN GAME LOOP
222 ' ASTEROID/PLANET COLLISION
230 FOR Q=2 TO 30 STEP2:CIRCLE(X
,Y),Q,RND(2)+2:PLAY"T255L25503V=
Q:CDG+V-B":NEXT Q
```

```
235 FOR Q=30 TO 1 STEP-1:CIRCLE(
X,Y),Q,2:PLAY"V=Q:02FBCA":NEXT Q
237 PLAY"V15":GOTO 340
239 ' TRAIL COLLISION
240 FOR Q=30 TO 1 STEP-1:PSET(AB
S(RND(30)+X-15),ABS(RND(30)+Y-15
),RND(4)):PLAY"T255L25501V=Q:BDC
":NEXT Q
245 PLAY"V15":GOTO 340
249 ' PICK UP BIN
250 FOR Z=(X-6) TO (X+6) STEP2:F
OR ZZ=(Y-6) TO (Y+6) STEP2:IF PP
OINT(Z,ZZ)=4 THEN PSET(Z,ZZ,2):N
EXT ZZ,2 ELSE NEXT ZZ,2
260 PLAY"T255L25503CDGA01DEGA":S
=S+20
270 SS=SS+1:IF SS<SK THEN 145
280 S=INT(S+SK*10)
290 GOSUB 700
300 PRINT@352,"AFTER CLEARING LE
VEL"SK"...":
310 PRINT@416,"BONUS="SK*10,"SCO
RE="S:
320 PLAY"T3L801FGABP100GAP100FGP
100EFP100L16CDEFGAB02L2CP2"
330 SK=SK+1:GOTO 20
335 ' GAME OVER SEQUENCE
340 GOSUB 700
345 S=INT(S)
350 PRINT@352,"SPACE DUST!","
GAME OVER!":
360 PRINT@416,"THE FINAL SCORE="
S:
370 PRINT@484,"PRESS ENTER TO CO
NTINUE":
380 QS=INKEY$
381 IF QS<>CHR$(13) THEN 380
385 ' HIGH SCORE ?????
390 GOSUB 700
395 IF S>HI(3) THEN PRINT@384,"G
REAT SCORE!!":PLAY"L1602CDEFGAB"
:INPUT"NAME ":S$:S$=LEFT$(S$,10)
400 FOR Q=1 TO 3
410 IF S>HI(Q) THEN FOR Z=3 TO Q
STEP-1:HI(Z+1)=HI(Z):HI$(Z+1)=H
I$(Z):NEXT Z:HI(Q)=S:HI$(Q)=S$ E
LS NEXT Q
420 GOSUB 700
430 PRINT@359,"THE TOP PLAYERS"
440 FOR Q=1 TO 3:PRINTQ:HI$(Q),H
I(Q):NEXT Q
445 PLAY"04T3L26DL4EFG"
450 PRINT@487,"PLAY AGAIN (Y/N)
?":
460 QS=INKEY$
470 IF QS="Y" THEN 500 ELSE IF Q
S="N" THEN POKE65496,0:CLS:END E
LS 460
499 ' INPUT SKILL LEVEL
500 GOSUB 700
510 PRINT@416,"STARTING SKILL LE
VEL (1-50)":
520 INPUT SK$:SK=VAL(SK$)
530 IF SK<1 THEN GOSUB 800:GOTO
500
535 IF SK>50 THEN SK=50
540 GOTO 15
599 ' TITLE & INIT.
600 POKE65497,0
```

```
605 RGB:CLS0:PALETTE1,0:PALETTE0
,34:PALETTE 12,9:PALETTE 13,0
606 'ON BRK GOTO 600
607 GOSUB 800
610 GOSUB 700
620 PRINT@388,"BY KENNETH REIGHA
RD, JR.":
630 PRINT@455,"COPYRIGHT (C) 199
2":
640 FOR Q=1 TO 5:PLAY"T9L801CDEF
GAB0ADF01BAGFEDC":NEXT Q
644 DIM HI$(4),HI(4)
646 FOR Q=1 TO 3:HI(Q)=""COCO":H
I(Q)=400-100*Q:NEXT Q
650 GOTO 500
699 ' CLEAR SCREEN SUB.
700 PRINT@352,STRING$(159,32)::P
OKE1535,96:RETURN
799 ' DRAW TITLE SUB.
800 RESTORE
803 CLSO
810 FOR Q=1 TO 352:READ Z:PRINT
CHR$(Z+128)::NEXT Q
830 RETURN
899 ' TITLE DATA
900 DATA35,35,35,35,35,35,35,35,
35,35,35,35,35,35,35,35,35,35,
35,35,35,35,35,35,35,35,35,35,3
5,35,35
901 DATA51,51,50,48,48,49,48,48,
48,48,48,64,64,83,83,82,82,80,80
,80,80,80,80,81,80,80,80,80,80,8
0,80,80
902 DATA48,58,48,62,58,61,56,62,
58,62,58,64,64,91,83,90,90,94,90
,94,90,94,90,93,88,94,90,94,90,9
0,80,85
903 DATA48,58,48,58,58,53,62,56,
58,76,72,90,90,94,90,90,90,9
4,88,85,94,90,90,92,92,93
904 DATA60,60,56,56,56,52,80,60,
56,56,80,80,80,88,80,88,88,88,
88,88,92,88,84,80,88,88,88,80,8
0,81,94
905 DATA83,83,83,83,83,83,83,83,
83,83,83,83,83,83,83,83,83,83,8
3,83,83,83,83,83,83,83,83,83,8
3,94
906 DATA3,3,2,113,113,113,115,1
12,112,113,113,112,112,112,112,1
12,114,112,112,112,112,112,115,
907 DATA10,14,10,14,10,14,8,10
,10,117,112,117,125,117,117,117
,125,117,124,116,126,117,125,117
,124,122,112,127,
908 DATA32,10,32,10,32,14,10,12,
10,14,10,32,117,112,117,117,117,
117,117,124,117,112,32,122,117,1
17,117,32,32,124,32
909 DATA32,8,32,8,32,8,12,8,8,
8,32,116,124,116,124,116,116,116
,124,116,124,32,120,116,124,116,
32,32,32,124,32
910 DATA44,44,44,44,44,44,44,44,
44,44,44,44,44,44,44,44,44,44,4
4,44,44,44,44,44,44,44,44,44,4
4,44,44
```

Product Review

The CoCo Collection: A Bit of Work and a Bit of Play

The CoCo Collection is a package of 13 ready-to-run programs for the CoCo 3. This new offering from Sheldon Parsons requires a disk drive, and you'll need a printer for a couple of the programs it includes. However, most of the programs are games.

The package is menu-driven; to get started, the user simply enters "RUN MENU". Each of the 13 programs is assigned a number or letter, and you need only press this character to run its associated program. Let's see what programs *The CoCo Collection* offers:

Blind Poker—a cute two-player game with nice graphics. The game is similar to "real" poker, but you don't get to peek at your face-down cards.

Mind Boggler—a game in which you attempt to rearrange two sets of colored blocks on a grid, but the game restricts you

to certain types of moves and jumps. I find *Mind Boggler* to be a real challenge.

Calendar Maker—a utility for creating a handy desk calendar. This program requires a printer.

Connect Four—the same game that has been around for many years. Designed for two players, this game is fun to play and frequently frustrating!

DOS Commands—This utility is a collection of handy commands for disk functions. It allows you to execute, rename, copy and kill disk files, as well as perform directory functions and print disk jackets with disk directories on them.

Hangman Jr.—The classic game of *Hangman* except that it uses no graphics. Another interesting twist is that you never hang the man either. You just keep playing until the correct answer is found. The 2computer keeps track of the letters used and displays them on the screen.

Indian Poker—plays like the old classic where each player holds a single card against his forehead; you can see everybody else's card but not your own. In this version you take turns looking at the computer screen to see the card your opponent has. No graphics, but the principle is the same.

Pair Two—a memory-type game in which you try to remember the colors found behind numbered blocks. I really had trouble with this one (obviously my memory is too short).

A Day at the Races—bet your "money" and take your chances. (Daily odds and tips are provided.) When the race begins, you see little "stick" horses racing across your screen. And just as on my trips to Churchill Downs, I lost my shirt on some 20-to-1 nag!

Reach for the Money—my favorite. This is a game in which the computer simply asks all sorts of questions; best of all, you get "money" for each right answer. Designed for two players, the first player to earn \$2000 wins the match.

Slot Machine 1—a non-graphic slot-machine game. It plays fine, but most won't use it since the next one is far superior.

Slot Machine 2—provides a nice graphic representation of a slot machine. You play with quarters, and when you win, you receive quarters (which spit out the bottom of the machine). *Slot Machine 2* is a lot of fun (but thank goodness they were electronic quarters).

Tic-Tac-Toe—no explanation needed here. This version does not use graphics,

but then graphics aren't really necessary. Designed for two players.

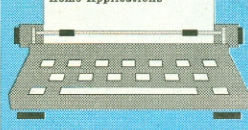
As a bonus, *The CoCo Collection* also includes a program called LOCK. This security program requires the user to enter the correct password before the computer can be used.

The CoCo Collection includes 10 pages of printed instructions describing what each program does and how to use it. The author also includes instructions for making a backup copy of the disk so the original can be kept safely tucked away.

Overall I am impressed with what *The CoCo Collection* has to offer; it is a nice package at a fair price. Keep in mind, however, the author accepts only money orders. (Sheldon Parsons, P.O. Box 117, Beaumont, N.D. Bay, NFDL A0J IAO, Canada; \$9.95 plus \$2 S/H)

—Jerry Semones

Home Applications



If you have written such a program for the CoCo, why not share it with others? We are now making tentative plans for the February 1993 issue of THE RAINBOW and are accepting submissions in BASIC and under OS-9 appropriate for that issue's theme, Home Help. All submissions must be received by us no later than October 26, 1992, and must follow our standard submission guidelines (see Page 8 for details and address).

We'd also like to see any other programs you have written (submitted material must be the original work of the submitting party, or submitted with written permission). All submissions are evaluated and considered for publication in future issues.



The following products have recently been received by THE RAINBOW, examined by our staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.



CoCo Cassette #118, a variety of programs for the CoCo 1, 2 and 3. This issue includes *Vocabulary Trainer*, great practice for the SAT and ACT tests; *Nourished 3*, a linear maze game for the CoCo 3; *Eye Witness 3*, tests youngsters' skill at identifying faces; *Temperature Conversions*, teaches the difference between Celsius and Fahrenheit; *Green House*, a game for those with (and without) green thumbs; *Addition Test*; a teachers' aid; *Demon Fire*, a space-based shoot-'em-up; *UFO Hunter*, ditto; *Shadow World*, a text adventure; and *Showdown in the Sewer 3*, a Turtle-based graphics game. *T & D Subscription Software*, 2490 Miles Standish Drive, Holland, MI 49424, (616) 399-9468. \$8.

The following products were received as a group from Walter Bayer of Coless Computer Design, 1917 Madera Street, #8, Waukesha, WI 53186, (414) 549-0750:

— **CIII PagesE v2.5**, the latest version of *CIII PagesE*, complete with a new manual and reference guide. Fontsets 2 and 3 now come with this package. Requires a CoCo 3, a disk drive and the Tandy Hi-Res joystick interface. \$29.95 plus \$3 S/H.

— **Video "U" Dig**, video-digitizing software for use with the Computize digitizer. Supports digitization through VCRs and cameras (B/W or color) and allows manipulation of captured images. Requires a CoCo 3, a Multi-Pak Interface, a disk drive, the Computize video digitizer and a mouse or joystick. \$19.95 plus \$3 S/H;

— **CIH ClipartE Set 2**, 450 clipart images in page, screen and stamp sizes for *CIH PagesE*. \$14.95 plus \$3 S/H;

— **M10 Clipart Set 2**, 300 clipart images for *Max-10*. \$14.95 plus \$3 S/H;

— **MX Clipart /SBK Set 1**, 300 clipart images (same as *M10 Clipart Set 1*) in scrapbook format for *CoCo Max III*. \$19.95 plus \$3 S/H;

— **MX Clipart /SYS Set 1**, 300 clipart images (same as *M10 Clipart Set 1*) in clipbook format for *CoCo Max II*. \$19.95 plus \$3 S/H;

— **MX Clipart /MAX Set 1**, 300 clipart images (same as *M10 Clipart Set 1*) in binary (PMODE 4) format for *CoCo Max*, *CoCo Max II* or any other PMODE 4 graphics program.

— **ZCLIP for CIII PagesE**, CIII clipart format images converted from Zebra Systems, Inc. picture disks 1 through 6. \$12 plus \$3 S/H; proof of picture disks purchase required;

— **ZCLIP for CoCo Max III**, scrapbook format images converted from Zebra Systems, Inc. picture disks 1 through 6. \$12 plus \$3 S/H; proof of picture disks purchase required:

—**ZCLIP for Max-10**, M10 clipart format images converted from Zebra Systems, Inc. picture disks 5 and 6. \$12 plus \$3 S/H; proof of picture disks purchase required.

The Rainbow Seal of Certification is open to all manufacturers of products applicable to the Tandy Color Computer, regardless of whether or not those companies advertise in THE RAINBOW. By awarding the Seal, we certify the product exists—we have a sample copy and have examined it. However, this does not constitute any guarantee of satisfaction. As soon as possible, these products will be forwarded to reviewers for evaluation.

Yes! They're still available!

RAINBOW Back Issues



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AT A BARGAIN PRICE**

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To order, review and fill out the form below and mail it with your payment.

For greater convenience, order through the Rainbow Magazine Services area of our Delphi CoCo SIG.

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DEC 86	Holiday	\$3.95	DEC 90	Holiday	\$3.95
JAN 87	Beginners	\$3.95	JAN 91	Beginners	\$3.95
FEB 87	Utilities	\$3.95	MAR 91	Home Help	\$3.95
MAR 87	Business	\$3.95	MAR 91	Hardware	\$3.95
APR 87	Home Help	\$3.95	APR 91	Music	\$3.95
MAY 87	Printer	\$3.95	MAY 91	Printer	\$3.95
JUN 87	Music	\$3.95	JUN 91	Summer Fun	\$3.95
JUL 87	Anniversary	\$3.95	JUL 91	Anniversary	\$3.95
	VOLUME 7			VOLUME 11	
AUG 87	Games	\$3.95	AUG 91	Graphics	\$3.95
SEP 87	Education	\$3.95	SEP 91	Education	\$3.95
OCT 87	Graphics	\$3.95	OCT 91	OS-9	\$3.95
NOV 87	Data Comm.	\$3.95	NOV 91	Data Comm.	\$3.95
DEC 87	Holiday	\$3.95	DEC 91	Holiday	\$3.95
JAN 88	Beginners	\$3.95	JAN 92	Utilities	\$3.95
FEB 88	Utilities	\$3.95	FEB 92	Home Help	\$3.95
MAR 88	Business	\$3.95	MAR 92	Hardware	\$3.95
APR 88	Home Help	\$3.95	APR 92	Music	\$3.95
MAY 88	Printer	\$3.95	MAY 92	Printer	\$3.95
JUN 88	Music	\$3.95	JUN 92	Programming	\$3.95
JUL 88	Anniversary	\$3.95	JUL 92	Anniversary	\$3.95
	VOLUME 8			VOLUME 12	
AUG 88	Games	\$3.95	AUG 92	Graphics	\$3.95
SEP 88	Education	\$3.95	SEP 92	Education	\$3.95
OCT 88	Graphics	\$3.95	OCT 92	OS-9	\$3.95
NOV 88	Data Comm.	\$3.95			
DEC 88	Holiday	\$3.95			
JAN 89	Beginners	\$3.95			

Feature Program

See What You're Deleting With EDIT

by Geoff Friesen

The EDIT command provided with BASIC for the TRS-80 Model III is nearly identical to the EDIT command in BASIC for the Color Computer. The difference is that the Delete subcommand (D) on the Model III highlights the deleted character as you press D. This "highlighting" is accomplished by displaying the deleted character between two exclamation marks. This feature makes it easier to see what you are deleting. Until now, though, it hasn't been available to CoCo users.

FIXEDIT makes the necessary patches to CoCo BASIC to provide character highlighting when the D subcommand of EDIT is invoked. The program is designed for the Color Computer 3 since these patches require the computer to be in an all-RAM mode. FIXEDIT may also work on a CoCo 1 or 2 in the all-RAM mode (see POKE, September 1992, Page 3), but such use has not been tested.

As a bonus, FIXEDIT also patches the RESTORE command. Once the program has

been run, you can restore the read pointer to any data line. In other words, you can have the READ command begin reading data from any DATA statement without using a loop to skip over previous data. Figure 1 shows a sample routine in which this is done.

You can use line numbers for non-existent lines (see Line 190 in Figure 1). The only restriction is that you may not use a line number greater than the line number of the last DATA statement in the program. If you do, you'll receive an OD (out of data) error.

Geoff Friesen has a bachelor of science degree in computer science and mathematics. He is the author of several published articles about computers. He may be contacted at General Delivery, Dauphin, MB R7N 2T3, Canada, (204) 638-7302. Please include an SASE when requesting a reply.

```
100 DATA NEW
110 DATA RESTORE
120 DATA COMMAND
130 RESTORE
140 READ B$
150 PRINT B$
160 RESTORE 120
170 READ B$
180 PRINT B$
190 RESTORE 109
200 READ B$
210 PRINT B$
220 END
```

Figure 1: RESTORE Example

CoCo 3

The Listing: FIXEDIT

```
10 'FIX EDIT AND RESTORE
20 'BY GEOFF FRIESEN
30 'COPYRIGHT (C) 1992
40 'BY FALSOFT, INC.
50 'RAINBOW MAGAZINE
100 *****
110 *** MINOR IMPROVEMENTS ***
120 *****
130 '
140 REM: EDIT D !C!
150 '
160 FOR I=&H0000 TO &H013
170 READ B$
180 POKE I,VAL("&H"+B$)
190 NEXT I
200 POKE &H5CB,&HBD
210 POKE &H5CC,&H00
220 POKE &H5CD,0
230 DATA 86,21,BD,A2,82,A6,84,BD
240 DATA A2,82,86,21,BD,A2,82,BD
250 DATA 85,D1,5A,39
260 '
270 REM: RESTORE [LINE#]
280 '
290 FOR I=&H014 TO &H022
```

```
300 READ B$
310 POKE I,VAL("&H"+B$)
320 NEXT I
330 POKE &HAB85,&H00
340 POKE &HAB86,&H14
350 DATA 10,27,2D,CC,BD,AF,67,BD
360 DATA AD,01,9E,47,7E,AD,E6
```

Feature Program

ADD HEADERS FOR EASY REFERENCE

by P.B. Blackwell

Have you ever run a program that you entered from an earlier RAINBOW only to find that you had forgotten how the program works? I find myself in this position often, and I've gotten a little tired of trying to remember which issue the program appears in so I could find the directions. Now I use program headers that include all the pertinent information.

The BASIC program in Listing 1, HEADER12, prints the title, author and issue for any program you specify. To use this header, first enter it as it appears and save it to tape or disk. Then when you are ready to enter a new program, load this header and edit it to properly reflect the program you are planning to enter. Finally, add the program, starting at Line 10. [Editor's Note:

Programs we've published over the last several years already include a header with our copyright notice. However, when we run listings for production, we don't always know ahead of time on which page a listing will fall. It's alright with us if you use the headers presented here, as long as you retain the copyright notice in our listings. All programs published in THE RAINBOW are copyrighted.]

Another way to accomplish the same thing if you have a disk drive is to edit the header and save it in ASCII format. You can then merge the header into an existing program (provided it does not have line numbers below 10). This is an excellent way to add the header to programs you've already entered.

If there is not enough space at the beginning of a program listing to include the header and you don't want to renumber the program, try renumbering the header and saving it at the end of the program you are entering. Then use a GOSUB or a couple of GOTOs to jump to the header routine.

The program in Listing 2, HEADER3, works much the same as HEADER12. The main difference is that this program supports the 40-column screen on the CoCo 3. If you have a monitor capable of displaying 80 columns, feel free to change the WIDTH

command and alter the LOCATE statements to suit your needs.

Pete Blackwell is a retired electronics technician who has owned and operated CoCos since December 1981. His hobbies include gardening (flowers and vegetables) and reading science fiction. He can be contacted at 4762 Nottingham Drive SE, Ft. Myers, FL 33905-4107. Please include an SASE when requesting a reply.

16K

Listing 1: HEADER12

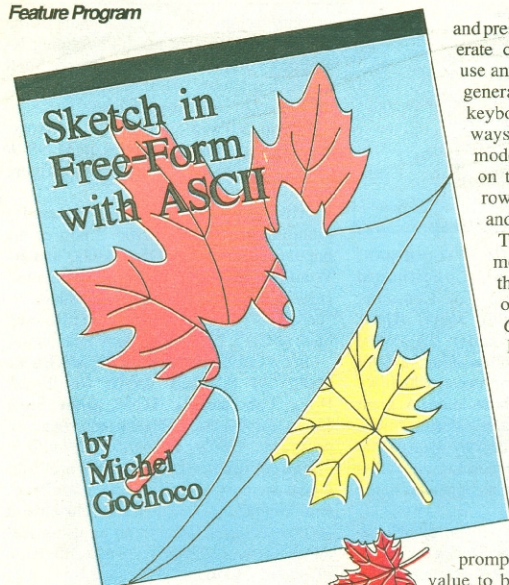
```
0 CLS:PRINTCHR$(13);"  HEADER1
for the CoCo 1 & 2"
1 PRINTCHR$(32);STRING$(29,42)
2 PRINTCHR$(32);CHR$(42);"  M
usic Sheet Paper";CHR$(42)
3 PRINTCHR$(32);CHR$(42);"
For the DMP-105";CHR$(42)
4 PRINTCHR$(32);CHR$(42);"  b
y Barry McNeice";CHR$(42)
5 PRINTCHR$(32);CHR$(42);"
Yakima, WA";CHR$(42)
6 PRINTCHR$(32);CHR$(42);"  (
c) Falsoft, Inc. ";CHR$(42)
```

```
7 PRINTCHR$(32);CHR$(42);" The R
ainbow June '86 pg.20 ";CHR$(42)
8 PRINTCHR$(32);STRING$(29,42)
9 PRINTSTRING$(5,13);STRING$(10,
32);"Press a Key";:EXEC 44539
```

Listing 2: HEADER3

```
0 WIDTH 40:CLS 5:LOCATE9,2:PRINT
"HEADER 3 for the CoCo 3"
1 LOCATE 15,5:PRINT"AutoGray"
2 LOCATE 13,7:PRINT"AutoGray Sca
ler"
3 LOCATE 8,9:PRINT"by Stuart Wys
s-Gallifent"
4 LOCATE 4,11:PRINT"(c) Falsoft,
Inc. - The Rainbow"
5 LOCATE 14,13:PRINT"May '92 pg
.4"
6 LOCATE 12,23:PRINT"Press any K
ey";:EXEC 44539
```


Feature Program



Clip Board is a quickie CoCo 3 program that lets you write memos or draw on the 80-column screen. The program is essentially a one-screen, full-screen (actually, 78 columns by 22 rows) text editor. Since the program uses the Hi-Res text screen, it'll be much easier to read the screen if you use an RGB or monochrome monitor. Use the arrow keys to move the cursor around,

and press the other keys to generate characters — you can use any character that can be generated from the CoCo keyboard. *Clip Board* is always in an "overwrite" mode; to erase a character on the screen, use the arrows to position the cursor and press the space bar.

To call *Clip Board's* menu, press SHIFT and the up arrow simultaneously. To return to the *Clip Board* screen, press R. If you select Option P from the menu, the program prints the text you have onscreen. Option N clears the screen, giving you a clean slate on which to work. To change the printer rate, press B. You'll be prompted for the appropriate value to be poked into Memory Location 150. Press E to end the program.

Clip Board is great for those quick note printing jobs and (as anyone who has seen ASCII graphics while online with Delphi or a BBS knows) for doodling with ASCII characters. I hope you enjoy it as much as I do. □

CoCo 3

The Listing: CLIPBOARD

```
1 'COCO 3 CLIPBOARD
2 'BY MICHAEL GOCHOCO
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 PALETTE RGB:WIDTH 80:ATTR 3,2
:CLS
20 CLEAR 5000:DIM A$(24)
30 A$(1)="*****"
***** COMPUTER CLIPBOARD **
*****
40 FOR A=2 TO 23
50 A$(A)="
"
60 NEXT A
70 FOR A=1 TO 24
80 PRINT A$(A);
90 NEXT A
100 A=2:B=1
110 LOCATE B,A-1
120 B$=INKEY$
130 IF B$="" THEN 120
140 GOTO 220
150 LOCATE B,A-1
160 MID$(A$(A),B+1,1)=B$
170 PRINT B$;
180 B=B+1
190 GOSUB 310
200 LOCATE B,A-1:PRINT A$(A);:LO
CATE B,A-1
210 GOTO 110
220 ON BRK GOTO 360
230 IF B$=CHR$(12) THEN 110
240 IF B$=CHR$(95) THEN 370
250 IF B$=CHR$(94) THEN A=A-1
260 IF B$=CHR$(10) THEN A=A+1
270 IF B$=CHR$(8) THEN B=B-1
280 IF B$=CHR$(9) THEN B=B+1
290 IF B$=CHR$(94) OR B$=CHR$(10)
OR B$=CHR$(8) OR B$=CHR$(9) TH
EN GOSUB 310 ELSE 150
300 GOTO 110
310 IF A-1<1 THEN A=2
```

```
320 IF A-1>22 THEN A=23
330 IF B<1 THEN B=1
340 IF B>78 THEN B=78
350 RETURN
360 END
370 CLS
380 LOCATE 23,12
390 PRINT "CLIPBOARD MENU"
400 PRINT TAB(25);"V-RETURN TO S
CREEN"
410 PRINT TAB(25);"P-PRINT SCREE
N"
420 PRINT TAB(25);"N-NEW SCREEN"
430 PRINT TAB(25);"B-SELECT BAUD
"
440 PRINT TAB(25);"E-END PROGRAM
"
450 PRINT:PRINT TAB(25);"SELECT
OPTION":
460 INPUT O$
470 IF O$="V" THEN 530
480 IF O$="P" THEN 600
490 IF O$="N" THEN 540
500 IF O$="B" THEN GOTO 560
510 IF O$="E" THEN END
520 GOTO 370
530 CLS:GOTO 70
540 CLS:CLER:GOTO 20
550 INPUT "POKE 150,":B
560 CLS:LOCATE 25,8
570 INPUT "POKE 150,":B
580 POKE 150,B
590 GOTO 370
600 FOR A=1 TO 24
610 PRINT #2,A$(A)
620 NEXT A
630 GOTO 370
```



EDDIE KUNS

The Forum is often the most active area of a SIG, with ongoing discussions, questions and answers, people swapping jokes, and other random chatter. Every SIG on Delphi has a Forum. You may not be interested in all of the messages in the Forum, or you may simply not have the time to read them all. How can you get by? How can you read the messages that interest you without spending a lot of time reading those that don't? Let's start with Forum basics.

You enter the Forum by typing FORUM at the SIG prompt and pressing ENTER. The

most obvious Forum command is EXIT or CTRL-Z, of course! These commands bring you back to the SIG's Main menu. You can also log off Delphi directly from the Forum by entering BYE.

When you enter the Forum, you see a message like that shown in Figure 1. (Of course there isn't really a Made Up SIG on Delphi! And I've changed the numbers to protect the innocent.) You can tell from the entry message that the most recent message in the Forum is 8796 and that the highest message you have read so far is 7700. In this imaginary SIG, you are almost 1100 Forum messages behind! Fortunately, only 10 of these unread messages are to you.

Notice the message Press RETURN to READ WAITING Messages. A waiting message is a message that is addressed to you that you haven't read yet. If you want to read only waiting messages, all you need to do is press ENTER (what Delphi calls the RETURN key) to read the first message to you. Once you have read this message, you press ENTER to read the next waiting message to you. When you have read all messages addressed to you, you'll see "No more messages" after pressing ENTER. If you now exit Forum, Delphi changes your high-message counter to the highest numbered message you've read.

If you want to read every message posted after the highest message you have read so far, you should type READ NEW. New messages are those messages posted after the highest numbered message you have read. If you type READ NEW, Delphi displays the next available message each time you press ENTER. (Of course messages longer than one

MadeUp> forum

Welcome to the Made Up Forum.
Forum contains messages 10 to 8796.
Highest message you've read is 7700.

You have 10 new messages.
Press RETURN to READ WAITING Messages.

FORUM>

Figure 1: Entering a Sample Forum

Word Power 3.3 (for CoCo III) \$39.95

Word Processor Comparison - April 89 Rainbow; Page 26... Just think of any word processing feature, chances are Word Power has it... packs a lot of features.. excellent word processor...

Fast, 40/80 column color & monochrome, word/wrap, help-screens, spooler, spell checking, mail-merge, macros, two-column printing, punctuation checker, and lots more.

Pokes, Peeks 'n Execs Books

These books will give you the power of Machine Language without leaving the security of BASIC. Each book is a collection of "inside" information with explanations and examples. Everyone from the novice to the professional will find these books a wealth of information.

#PK500 • 500 Pokes Peeks 'n Execs \$16.95

500 commands such as BASIC Program Autostart. Rompak Transfer to tape. Commands/Keys Disables and much much more! For CoCo 1,2, & 3

#PKSUP • Supplement to 500 Pokes Peeks 'n Execs. 200 additional commands such as Rompak transfer to disk, double-sided drive support, 40/80 track drive support & much more! For CoCo 1,2,3.

#PK300 • 300 Pokes Peeks 'n Execs for CoCo 3 All new commands for the CoCo 3!!!

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_____ item # WP33	\$39.95	_____
_____ item # PK500	\$16.95	_____
_____ item # PK300	\$19.95	_____
_____ item # PKSUP	\$9.95	_____

Shipping \$3.00

_____ Tax for NY & NJ residents
OPTIONAL ORDER FORM TOTAL _____

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Address _____

City _____

State _____ ZIP _____

Card# _____ Exp. ____/____/____

Checks, MO's VISA/MC accepted, no COD

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This offer is limited to one copy per family to first time Zebra customers only. It's our rather extreme way of introducing the Zebra product line to those CoCo users who've read all the great reviews of our products over the years and still haven't tried them. \$10 includes everything (except NY residents must add sales tax). Offer good for mail orders only and expires December 15, 1992.

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screen will be paused at each screenful.) You will encounter at least some of your waiting messages by reading through all new messages.

Why only some? It has to do with the way Delphi keeps track of waiting messages and your highest message. Waiting messages remain waiting until you have read them; however, if you read the last message in the Forum and then leave the Forum, Delphi marks your high message as the last message in the Forum! Thus, if you still have waiting messages, READ WAITING will find them, but READ NEW will not.

If the highest message in the Forum is 1100 messages higher than your high message, that doesn't imply that you have 1100 messages to read. Why not? Some messages may have been deleted. Anyone can delete a message he has sent or received. And you may have deselected some of the topics.

The OS9 Online and CoCo SIG Forums — indeed, all Forums on Delphi — have exactly the same topics as those in their respective databases. However, you can choose to ignore certain topics in the Forum. For example, if you regularly read the Forum in the CoCo SIG but are not interested in either graphics or hardware hacking, you probably would not be interested in articles posted to the CoCo 3 Graphics, Hardware Hacking or Classic Graphics topics. To ignore all postings to a given topic, use the CLEAR command while in Forum. For example, to ignore articles from the CoCo 3 Graphics topic and then check which topics you have enabled and disabled, you type:

```
FORUM> clear coco
"CoCo 3 Graphics" is no longer one of
your default topics.
```

```
FORUM> show
```

Topics set:

```
General Information
Source for 6809 Assemblers
Utilities & Applications
Hardware Hacking
Games
Classic Graphics
Music & Sound
Info on Rainbow
Archives
HELP
Product Reviews & Announcement
Rainbow On Tape
Telecommunications
Soapbox (chitchat)
```

Topics available (not set):

CoCo 3 Graphics

Use the SET command to make a topic visible that is currently disabled. The disabled topics are listed above under Topics available (not set): — so far you have disabled only the CoCo 3 Graphics topic.

Most Forum articles are posted to the General Information topic, but many people try to put messages into the proper topics. It's always best to try to put your messages into the appropriate topics.

Now that we've discussed topics and high message counters and waiting messages, what does a message look like? Figure 2 shows a fictional message in the Made Up SIG. The article was sent on the second of July (this year); messages older than about 3 months show the date in a slightly different format. This Forum article was posted to the General Information topic. The subject is "RE: How do you DO that?" and the message is in reply to a previous

```
7754 02-JUL 00:54 General Information
RE: How do you DO that? (Re: Msg 7688)
From: MYFRIEND To: ME (NR)
```

```
Hi. I saw your question and thought I'd send you a program to show you
how. Check your EMail.
```

Your Best Friend

Figure 2: A Sample Message

message in the Forum: message number 7688. ("RE:" is a common shorthand for reply. When you reply to a message, "RE:" is automatically prepended to the subject.) This message was written by Delphi user MYFRIEND and was meant for Delphi user ME. The "(NR)" after the "To:" name indicates that the message recipient has not yet read this message; "NR" is short for "Not Read."

Next month I'll continue discussing Forum, and I'll mention ways to save money and search through old Forum messages to find answers to questions. Quite a bit of wisdom is stored in several years worth of old Forum messages in both the CoCo and OS9 SIGs!

New Weekly Conference

Chris Deierlein (CDEIERLEIN) is hosting a new weekly conference in the OS-9 SIG titled "OS-9 Help Line." The conference starts each Thursday at 10 p.m. Eastern time. Other members of OS9 Online drop in from time to time. If you have any questions about OS-9 you want to ask, this a good place to ask them.

May Uploads

The big news this month in the OS-9 SIG

is **Marty Goodman's** (MARTYGOODMAN) reports from the Chicago CoCo Fest hosted by CoCoPro! and his trip to the Consumer Electronics Show with **Steve Bjork** (6809ER). **Rodger Alexander** (SALZARD) also uploaded information about a later show in the Pacific Northwest, which we will hopefully hear about later. A great amount of May (and later!) Forum traffic followed the arrival of the May issue of THE RAINBOW when people read Lonnie Falk's editorial; some of this also appeared in the databases!

Darren Kindberg (DKINDBERG) released a demo version of *GIndex* for *Multi-Vue*. **Jim Vestal** (JIMVESTAL) uploaded a port to the CoCo of *Scribe*. This program allows you to connect to certain BBSs and download all your unread mail, and then read it at home when you have hung up the phone. You can save considerably on your phone bills if you regularly connect to a BBS that allows you to use *Scribe*.

Philip Brown (THEFERRET) contributed programs to several database topics! One is the OS-9/68000 binary for the Bourne Shell, sh, from the TOP distribution disks. This popular shell is derived from a standard UNIX Shell. Philip also released a program for K-Windows that allows you to set fore-

ground/background colors and more on the MM/1 and any other machine running K-Windows. Finally, *Redial* is a Bourne Shell script that allows you to keep redialing a busy number until you connect.

David Wilson (KRELL) provided example C code that uses signals under OS-9/6809 to help those who are trying to figure out how to use signals.

Mike Sweet (DODGECOLT) released a preliminary version of *Doc*, a port of his popular editor *Ed* to OS-9/68000 and K-Windows. **Robert Heller**'s (RHELLER) *Home Librarian* maintains a database of "cards" — you can use this program to keep track of CD's, books, and many other items.

In the CoCo SIG this month, **Chris Burke** (COCOXT) released BASIC for Frank Hogg Laboratory's TC-9. **John Saya** (SAYA) uploaded his disk management program, *CoCo Directory Manager*. **Johnny Williams** (DRILLMASTER) contributed a memory exercise game, *Memlcons*, similar to *Concentration*. **Don Hutchison** (DONHUTCHISON) shared an amusing history of the world in the form of a collection of student bloopers.

Eddie Kuns is pursuing a doctorate in physics at Rutgers University. He lives in Aurora, Illinois, and works as a programmer and researcher at Fermilab. Eddie is the database manager of the OS-9 SIG and can be reached online as EDDIEKUNS.

DATABASE REPORT

OS-9 SIG

General Information

```
SAT. SESSION REPORT ON COCOFEST
MARTYGOODMAN Marty Goodman
REPORT ON CHICAGO CES & COCOFEST
MARTYGOODMAN Marty Goodman
INSIDE OS9 LEVEL II BOOK/DISK
FHOGG Frank Hogg
NORTHWEST COCOFEST
SALZARD Rodger Alexander
NW COCOFEST TRIVIA CONTEST
SALZARD Rodger Alexander
NORTHWEST FEST ANNOUNCEMENT
SALZARD Rodger Alexander
RESPONSE TO RAINBOW EDITORIAL
PDUNC Paul Duncan
LONNIE FALKS MAY '92 EDITORIAL
JIMVESTAL Jim Vestal
```

Applications (6809)

```
CRYPTO (REVISED) AND ENCRYPTO
RICKGRAY Rick Gray
TSEDIT "VI" PATCHES V1.2
RICKADAMS Rick Adams
GINDEX 1.1 FOR MULTIVUE
DKINDBERG Darren Kindberg
VU TEXT FILE VIEWER VERSION 1.1
JIMVESTAL Jim Vestal
HEX. & DEC. CONVERTING UTILS
TAFOLD Scott S. Stone
HDBACKUP: HARDDISK IMAGE BACKUP
MARKGRIFFITH Mark Griffith
```

Telecom (6809)

```
DOMINIONS V2.1: RIBBS GAME
EMTWO Paul M. Fitch, Jr.
PATCHED AUTOMODE FOR OSTERM
DBURGETT Dave Burgett
SCRIBE OFFLINE READER FOR QWK PA
JIMVESTAL Jim Vestal
```

Games & Graphics

```
LONE WOLF (VEF)
MOHRT Tim Mohr
VEF2GIF: ANOTHER VEF TO GIF UTIL
RICKMAC Richard McNabb
RAYTRACES (GIF)
JOHNBAER John Baer
VEF2GIF: GIF CONVERTER
MEYE001 Homer Meyer
```

YRBIO: BIORYTHM PROGRAM

```
WOAY Jim Martin
GIF CONVERSIONS
MEYE001 Homer Meyer
SUNSET - RAYTRACE (GIF)
JOHNBAER John Baer
AUTODESK ANIMATOR FLI/FLC FORMAT
MIKEHAALAND Mike Haaland
DKBTRACE: RAY TRACEING PACKAGE
COMPER Glen Hathaway
FIVE SIMPLE RAYTRACES (GIF)
COMPER Glen Hathaway
```

Music & Sound

```
SWEDISH CHEF (DIGITIZED)
MICHAELJN Mike Nelson
```

Programmers Den

```
CNTX: C SYNTAX CHECKER
WOAY Jim Martin
SH: BOURNE SHELL BINARY
THEFERRET Philip Brown
OSIG.C: SIGNAL HANDLING EXAMPLE
KRELL David Wilson
```

OSK Applications

```
TEXT MODE UTIL
THEFERRET Philip Brown
ISPELL 2.0.02.1: SPELLING CHECKER
KSCALES Ken Scales
OS-9/6809 EMULATOR
SEMMLER John Semler
DOC V0.05: TEXT EDITOR
DODGECOLT Mike Sweet
HOME LIBRARIAN
RHELLER Robert Heller
MM/1 35 FONTS UPDATE
JOELHEGBERG Joel Hegbert
35 FONTS FOR THE MM/1!
JOELHEGBERG Joel Hegbert
```

OSK Telecom

```
REDIALER SHELL SCRIPT
THEFERRET Philip Brown
```

Tutorials & Education

```
INTERNET ADDRESS GUIDE
MRGOOD Hugo Bueno
```

STARTING GCAL AFTER BOOTING

```
DKINDBERG Darren Kindberg
```

CoCo SIG

General Information

```
REPORT ON SATURDAY OF COCOFEST
MARTYGOODMAN Marty Goodman
PNW COCOFEST
SALZARD Rodger Alexander
FRIDAY NITE IN CHICAGO
MARTYGOODMAN Marty Goodman
TC9BASIC
COCOXT Christopher Burke
```

CoCo 3 Graphics

```
GOOD GIF FILES
SAYA John Saya
GIF PICTURES
SAYA John Saya
STILLIFE.GIF
SAYA John Saya
4 IMAGES OF PAUL MCCARTNEY
DEANHOLDER Dean Holder
GIF TO CM3 CARTOONS
RICKMAC Richard McNabb
```

Utilities & Applications

```
COCO DIRECTORY MANAGER (CDM/BAS)
SAYA John Saya
HORSEPRO/ARC
JERRY79 Jerry Brown
```

Games

```
MEMICONS
DRILLMASTER Johnny Williams
```

Music & Sound

```
RICHARD MARX'S 'HAZARD'
BAWILLIAMS Bob Williams
```

Soapbox (chitchat)

```
HISTORY OF THE WORLD
DONHUTCHISON Don Hutchison
```


Announcing UpTime

The new newsletter than gives you the latest scoop about the CoCo, OS-9, and OSK world!

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OS-9

ODDS CONTINUED FROM COVER

plication, you may want to take a careful look at this routine — notice that it computes only the bottom 16 bits of the 32-bit result. (I've used the !. symbol to indicate the logical AND operation, in accordance with Motorola assembler conventions. Your assembler may differ.)

Going Further

The linear congruential generator returns a random number between 0 and 65535, inclusive. This is probably not the range you'll want, so you'll need to convert it for the desired range. Before doing so,

however, consider this: For this sort of random-number generator, where the modulus is a power of two, the low-order bits are not as random as the high-order bits. In the resulting sequence, the bottom bit alternates. So, you should always depend on the high-order bits. For example, to get a random number from 0 to 255, use the high-order byte, not the low-order byte.

In general, there is an easy trick for scaling numbers like this. If we treat the number as having a decimal point at the left, we can actually interpret the random number as being in the range 0 to .99998. To get a random number between 0 and 10, for example, just multiply by 11. The high-

```
* Get a dice roll from 1 to 6
* Returns value in A, destroys CC, all other registers preserved
*
rand6    pshs    b    Save B
        bsr     rand  Get random number
        ldb     #6    Ignore the low-order byte
        mul     Convert to a random number from 0 to 5
        inca    This gives a random number from 1 to 6
        puls    b,pc  Restore B and return
```

Figure 2: Sample Dice Routine

```
mult     equ     13849    Hex $3619
const    equ     25173    Hex $6255

rand      lda     seed     High-order byte of seed
          ldb     #mult!.255 Low-order byte of multiplier ($19)
          mul
          pshs    b        Save the partial result
          lda     seed+1    Low byte of seed
          ldb     #mult/256 High byte of multiplier ($36)
          mul
          pshs    b        Save the partial result
          lda     seed+1    Low byte of seed
          ldb     #mult!.255 Low byte of multiplier ($19)
          mul
          adda    ,s+      Add the partial results
          adda    ,s+
          addd    #const   Add const
          std     seed     Save the new seed
          rts            Return the result in D
```

Figure 1: The rand Subroutine

order byte of the result will then be between 0 and 10, as desired.

To see what we're talking about, look at Figure 2, which shows a short subroutine that returns a random dice roll. It has been simplified by ignoring the low-order byte of the random number completely, which only creates a small error in our scaling. This optimization is acceptable in this case, but if you needed random numbers from 1 to 600, for example, you should use the full 16-bit result returned by rand.

For More Information

The only really good discussion I've found of random-number generators is in the first half of Volume Two of Donald Knuth's series *The Art of Computer Programming*, titled "Seminumerical Algorithms." Unfortunately the content is very technical and does not include many concrete examples. If you are comfortable with formal statistics and number theory, this

text can be a very useful source of ideas. It includes a lengthy discussion of testing random-number generators.

That's all for this first installment of "Tips, Tricks and Traps." Next time we'll take a look at a little trick I use for converting hexadecimal numbers into ASCII.



Tim Kientzle is currently pursuing a doctorate in mathematics at the University of California at Berkeley. He is the author of *V-Term* and has worked with the *Color Computer* since 1982.

Product Review

The CoCo Font Pro Adds Flexibility to CoCo 3 Typefaces

The *CoCo Font Pro* is a font-design and -selection program for the CoCo 3. With it, you can create new fonts or use the seven fonts included to display many different typefaces on the CoCo 3 graphics screens from within your BASIC programs (using HPRINT). Written in machine language, *The CoCo Font Pro* is fast; and the menu-driven user interface (along with the many prompts and dialogue windows) makes the program very user-friendly.

The CoCo Font Pro requires a disk drive and works with any type of monitor. To get the program running, all you need to do is enter DOS or, if you have Disk BASIC 2.0, enter LOADM"LOADER":EXEC. A colorful menu appears providing options for loading the font editor, loading the Install module, or quitting.

The editor shows all of the characters and symbols in a specific font. Selection of a single character for modification is done via the right joystick. The editor screen also shows a grid, called the zoom window, in which the selected character is displayed while you are working on it. Editing is performed on a pixel-by-pixel basis and is controlled via the right joystick. At any time, you can load a previously constructed font set for editing or viewing. You can also save the font set currently in memory.

Since fonts are saved in sets of six, *The CoCo Font Pro* requires you to enter a filename for the set as well as ID numbers for the fonts. These font ID numbers help you keep track of which font is which when you use them in BASIC. This also brings us to one of the handiest features of *The CoCo Font Pro* system: Since you'll have up to six fonts in memory simultaneously, you can choose the font you want at any time.

You can even mix fonts on the graphics screen.

Before you can use the new fonts from within BASIC, you must add a short subroutine to your BASIC program. This subroutine is included on the disk in ASCII format, facilitating easy merging into your program. The actual font selection is accomplished by using a simple poke along with the appropriate ID number for the font you want. Also included with *The CoCo Font Pro* is a demo program that displays all six installed fonts on an HSCREEN2 page.

The Install option allows you to select the six fonts you want placed in a given font set. When you first run the program, all six memory blocks are set up to reflect the normal font. Using the arrow keys, you simply move a pointer to select the six fonts (by name) that you want to use.

The CoCo Font Pro includes the following fonts: Normal, Normal Inverted, Picture, Script, Fancy, Outline and Bold. Other ready-to-use fonts are available, including Old English, Future, 1940s and more. The optional font-set disk also includes a utility that allows you to renumber the font sets, as well as a utility for converting *McPaint* fonts to *The CoCo Font Pro* format.

The CoCo Font Pro is an excellent product and will be useful to most CoCo hackers and software tinkerers. It's simple yet effective and can even be used by novices. It's also priced right for today's Color Computer market. (*Color Computing Software*, 65 Oak Road, Canton, MA 02021; \$14.95 plus \$1 S/H; optional font disk, \$4.95.)

—Robert Gray

Feature Program

Now that the school year has begun, students in beginning chemistry are probably wondering why they took that course. Many find themselves looking for all the help they can get. *Molecular Mass Finder* is a simple Color Computer program designed to ease the burden by calculating the mass of specific compounds.

When you run *Molecular Mass Finder*, you are asked to enter the symbol for an element. Simply type the standard chemical symbol (e.g., Fe, H, etc.) for the first element in the compound and press ENTER. You are then asked for the number of atoms of this element in the compound. Repeat this for each element; as you add new elements to the compound, the new total molecular mass appears onscreen. This result is displayed in terms of grams per mole. (Do you remember Avogadro's number?) To start a new compound, press ENTER twice.

Molecular Mass Finder handles most common elements. To add support for some of the less common elements, add to the DATA statements in the program. The format used places the symbol for the element first, followed by the atomic weight. If you add data, make sure the last data entry in the list is XXX, XXX (see the end of Line 90).

Kevin Speight is a university student who enjoys using his CoCo for programming and word processing. He can be contacted at Box 266, Howe Hall, Dalhousie University, Halifax, Nova Scotia, B3A 4J5. Please include an SASE when requesting a reply.

Molecular Mass Finder.

by Kevin Speight

16K Extended

The Listing: MOLEMASS

```
1 'MOLECULAR MASS
2 'BY KEVIN SPEIGHT
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
30 TL=0
40 CLS:PRINT" MOLECULAR MAS
5 FINDER":PRINT@416,"PRESS ENTER
TWICE TO ERASE TOTALPRESS ENTER
AT SECOND PROMPT FOR
ONE ATOM":PRINT@292,"TOTAL: "
:TL:"GRAMS/MOLE"
50 PRINT@96,"symbol of element:
":INPUTEL$:INPUT"number of atom
s: ";NUS:IFEL$=""THENRNEELSEIF
NUS=""THENNU=1ELSENU=VAL(NUS)
60 RESTORE
70 READ$IFX$="XXX"THENPRINT@26
3,"element not found.":SOUND1,1:
FORX=1TO1400:NEXT:GOTO40
80 DATA,12.01,H,1.01,O,16.00,CL
,35.45,N,14.01,NA,22.99,AL,26.98
,S,32.06,CA,40.08,ZN,65.38,K,39.
1,BA,137.33,P,30.97,AG,107.87,CR
,52.0,IO,81,S,1,28.09,F,19,CU,63.
55,NI,58.71,FE,55.85
90 DATAM,54.94,MG,24.31,LI,6.94
,BE,9.01,BR,79.9,AS,74.92,HG,200
.59,PB,207.19,BI,208.98,AU,196.9
7,RB,85.47,SN,118.69,SB,121.75,C
S,132.91,I,126.9,CO,58.93,XXX,XX
X
100 IFX$<EL$THEN70ELSEREADNU(1)
:TL=TL+(NU(1)*NU)
110 GOTO40
```


Feature Program

OS-9 Database Saves NETWORKING INFO

by Philip G. Scherer

BBS9 is one section of a three-part database system I wrote for OS-9 Level II on the Color Computer 3. I use BBS9 to allow easy access to phone numbers and locations for the computer bulletin boards I contact. It can also be used to store and retrieve numbers for Delphi, GENie, CompuServe and networks. As published in this article, **BBS9** is a stand BBS database.

BBS9 is written in C, and you'll need the Microware C Compiler to compile the source code. The program has been tested and compiled using a 512K CoCo 3, but it should also work with 128K machines. Since **BBS9** uses Level II's windows, you do need OS-9 Level II. Also, the `makdir` command is required when you first set up the program. (This command is included with Level II.) In order to compile **BBS9**,

you also need the `cgfx.l` graphics library, which is supplied with *Multi-Vue*. Alternatively, a C graphics library is available for downloading from the databases in the OS9 Online SIG on Delphi. The compiled ready-to-run program is on this month's RAINBOW ON DISK for those without access to the Microware C Compiler.

The source-code is broken into four files for easier editing and handling, and they are

commented so you can follow the program's logic. The first file is the main control program, `bbs9.c`. This section provides the **BBS9**'s Main menu. The second file, `bbssearch.c`, includes the `bbssearch.c` function only and is the primary search function used when **BBS9** is running. The third file is `bbsen_del.c`, which is made up of the functions `bbsEnter.c` and `bbsDelete.c`. `bbsEnter` allows you to enter new BBS records, and `bbsDelete` handles the deletion of unwanted records. The final source-code file for the **BBS9** system is `bbsdis_ch.c`. This section contains the display and change functions that are called and used by the other functions for screen display and editing.

Using the Program

After you have compiled the **BBS9** source code, you must create a directory named **BASE9** in the root directory of your /dd device. Do this with the `makdir` command as follows:

```
makdir /dd/BASE9
```

You are now ready to run **BBS9**. To do so, just enter `bbs9` at the OS9: prompt.

The first time you run **BBS9**, a prompt appears informing you that the database doesn't exist and asking if you want to create it. Press Y and the program creates and initializes the database file `bbs` in the **BASE9** directory. After this, the Main menu appears, with options for searching, adding new records, deleting records and quitting. **BBS9**'s Main menu is "hot-keyed", so you don't have to press ENTER after selecting an option — simply press the number corresponding to what you want to do.

At this point, there are no records in the database. Press 2 to enter new records and the program prompts you to enter the name of a BBS. If you change your mind and decide not to enter new records, simply press ENTER by itself here. After you enter a BBS name, **BBS9** asks you to enter the phone number and location, and your User ID and password for the BBS. When entering untried BBSs, I leave the last entries blank or fill them with <na> and change them later. Finally, the program asks if you want to record your entries. To save the record to the database file, press Y. (Hint: I find it easier to go ahead and save the record and go back later to correct mistakes than to retype the entire record.) Once the record is saved, you are asked if you want to enter information for another BBS. Press Y or N accordingly. Note that if you enter a BBS name that already exists in the `bbs` database file, the program alerts you and does *not* overwrite the existing record. **BBS9** is designed to trap user errors.

Once you have added records to the database, you can select the search option (Option 1) from the Main menu. After selecting this option, press 1 again and enter the name of the BBS you want to find. This part of the search function is most useful for calling up information when you have more than one BBS name beginning with the same letter(s). It is also the only route to take when you want to edit a record's contents. Otherwise, it is easier to select Function 2 on the Search menu, then press the first letter of the BBS name you want. If you select Function 2, **BBS9** steps through every record for BBSs beginning with that letter. Function 3 on the Search menu allows you to list all the records in the data-

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base, and Function 4 returns you to the Main menu.

Option 3 on the Main menu is the Delete function. When you select this option, you are asked for the name of the BBS listing you want to delete. If you select the Delete function erroneously, simply press ENTER to return to the Main menu. After you enter a BBS name here, you are given one more opportunity to abort.

As a final note, BBS9 always converts the name of the BBS to uppercase charac-

ters when handling records. All other fields are stored just as you enter them.

Phil Scherer is a mechanical-design engineer for automatic packaging and assembly systems. In addition to working with OS-9 on the CoCo, his hobbies include snorkeling and horticulture. He can be contacted at 6191 NW 34 Hwy., Ft. Lauderdale, FL 33309. Please include an SASE when requesting a reply.

OS-9 Level II

Listing 1: bbstop.c

```
#include <stdio.h>
#include <string.h>
#include <ctype.h>
#include <stdlib.h>

direct struct base {
    char name[15];
    char number[15];
    char location[25];
    char id[15];
    char pass[20];
} record;

direct struct tempo{
    char name[15];
    char number[15];
    char location[25];
    char id[15];
    char pass[20];
}temp;

pfinit();

char database[]="DD/BASE9/bbs";

main()
{
    char ch;
    FILE *fp;
    int init=0;

    #asm
    info "BBS9 v1.3 copywrite P.Scherer 1992"
    #endasm

    setbuf(stdin,0);
    setbuf(stdout,0);

    /*create database if it doesn't exist*/
    if((fp=fopen(database,"r"))==NULL){
        OWSet(1,1,10,7,60,12,0,1);
        printf("\n\n Database %s does not exist\n",database);
        printf("\nDo you wish to open one with this name? ");
        ch=getchar();
        if(ch=='y'||ch=='Y'){
            fp=fopen(database,"w+");
            fwrite(&init,sizeof init,1,fp);
        }

        /*create initial file in database*/
        strcpy(record.name,"???");
        fwrite(&record,sizeof (struct base),1,fp);
        fclose(fp);
        OWEnd(1);
    }
    else { OWEnd(1);
        return; }

    /*create main menu*/
    OWSet(1,1,0,0,80,24,0,2);

    do {
        OWSet(1,1,12,6,60,12,0,4);
        OWSet(1,1,10,7,60,12,0,1);
        OWSet(1,1,11,8,58,10,3,2);
        CurXY(1,28,1);
        puts("MENU");
        puts("\n 1) Search"); puts(" 2) Enter New Record");
        puts(" 3) Delete A Record");
        puts(" 4) Exit");

        /*force a selection from 1 to 4*/
        do{
            CurXY(1,0,8);
            DelLine(1);
            CurXY(1,14,8);
            printf("SELECT A NUMBER: ");
            ch=getchar();
        } while(ch<49||ch>52);

        /*call appropriate function*/
        switch(ch) {
            case '1':bbsSearch(database);
                break;
            case '2':bbsEnter(database);
                break;
            case '3':bbsDelete(database);
                break;
            default: OWEnd(1);
                OWEnd(1);
                OWEnd(1);
        }
    } while(ch!=52);
}
```

Listing 2: bbssearch.c

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>

extern direct struct base{
    char name[15];
    char number[15];
    char location[25];
    char id[15];
    char pass[20];
} record;

bbsSearch(database)
char database[25]; {
    char ch,ch2;
    register int x;
    int count;
    register int y=1;
    int w=0;
    long z=(sizeof (struct base));
    long loc;
    FILE *fp;
    char choice[20];

    /*create title window and search menu window*/

    OWEnd(1);
    OWEnd(1);
    OWEnd(1);
    OWSet(1,1,3,1,24,3,0,1);
    OWSet(1,1,4,2,22,1,3,2);

    printf(" BBS SEARCH FUNCTION");

    /*main search loop*/
    do {

        /*restore menu window if a search or change happened*/
        if(y){
            OWSet(1,1,21,5,44,14,0,1);
            OWSet(1,1,23,6,40,12,0,2);
            Clear(1);
            printf("\n\n 1) Search by name\n");
            printf(" 2) Search by First Initial of name\n");
            printf(" 3) List names in database\n");
            printf(" 4) Exit Search");

            /*force selection of 1 to 4*/
            do {
                CurXY(1,0,8);
                DelLine(1);
                CurXY(1,5,8);
                printf("CHOOSE SEARCH OPTION: ");
                ch=getchar();
            } while(ch<49||ch>52);

            /*close windows and exit to main menu*/
            /*:if exit is chosen*/
            if(ch=='4') {
                OWEnd(1);
                OWEnd(1);
                OWEnd(1);
                return; }

            /*open file for read and write*/
            if((fp=fopen(database,"r+"))==NULL) {
                printf("%s not accessible\n",database);
                puts("press any key: ");
                ch=getchar();
                return; }

            /*read the number of entries in the bbs database*/
            fread(&count,sizeof count,1,fp);

            /*handle selection from menu*/
            switch(ch) {

                /*start of search by name*/
                case '1':Clear(1);
                    CurXY(1,7,3);
                    puts("Press <ENTER> to abort.");
                    CurXY(1,2,6);
                    printf("Enter BBS to find: ");
                    x=readln(0,choice,19);
                    choice[--x]=0;

                    /*return to search menu if abort is chosen*/
                    if(!*choice) {
                        fclose(fp);
                        break; }

                    /*convert search name to upper case for comparison to file entries*/
                    for(y=0;choice[y];y++){
                        choice[y]=toupper(choice[y]);
                        y++;
                    }

                    /*search and compare loop*/
                    for(x=0;x<count;x++){
                        fread(&record,sizeof (struct base),1,fp);

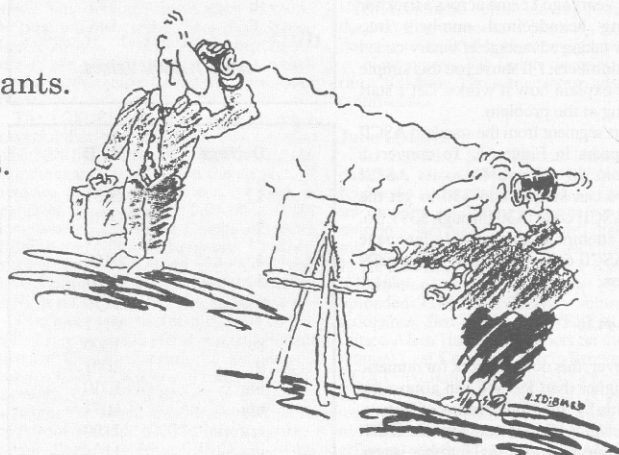
                        /*call display function if match is found*/
                        if(!strcmp(choice,record.name)) {
                            y=display(x,y);
                            break;}}

                    /*announce search failure if no match is found*/
                    if(x>count){
                        Clear(1);
                    }
                }
            }
        }
    }
```


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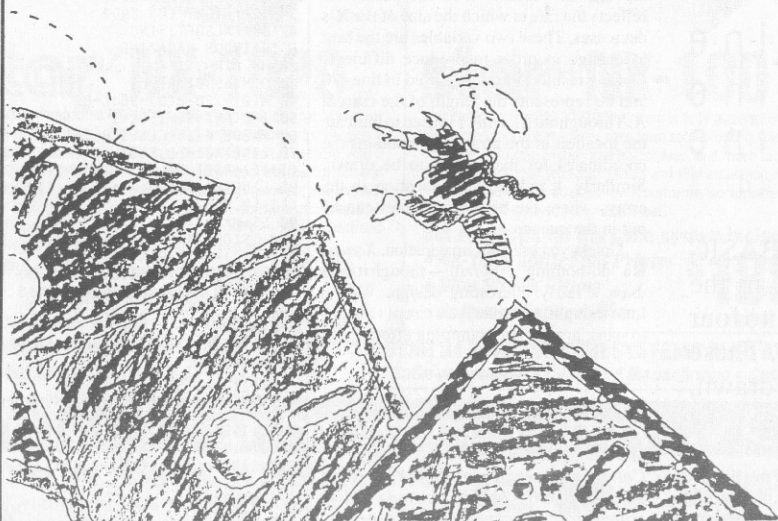
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```

        CurXY(1,2,4);
        printf(" There is no record of %s\n",choice);
        printf("\n Press any key.");
        ch=getchar();
    else
    do{
/*give change option if search is successful*/
        printf("\n Do you want to change anything <Y or N> ");
        ch=getchar();
        if(ch=='Y' || ch=='y'){
            CrRtn();
            ErLine();
            change();
            display(x,y);
            w++;
        }while(ch==89 || ch==121);

/*write new record if <w> is greater than <0> indicating a change*/
        if(w){
            loc=((loc-ftell(fp))-sizeof (struct base));
            fseek(fp,loc,0 );
            fwrite(&record,sizeof (struct base),1,fp);
            w=0; }

        fclose(fp);

/*erase display window and return to top of loop*/
        if(y){
            OWEnd(1);
            OWEnd(1); }
        break;

/*start of search by first initial*/
        case'2':Clear(1);
        CurXY(1,8,3);
        puts("Press <ENTER> to abort.");
        CurXY(1,8,6);
        printf("Enter first initial: ");
        ch=getchar();
        if(ch=='\n'){
            fclose(fp);
            y=0;
            break;}

/*convert search letter to upper case for compare with first letter in file*/
        ch=toupper(ch);
        y=0;

/*search and compare loop*/
        for(x=0;x<count;x++){
            fread(&record,sizeof (struct base),1,fp);

/*call display if match is found*/
            if(record.name[0]==ch){
                y=display(x,y);
                printf("\n Press any key to continue.");
                printf(" Press <E> to end search: ");
                ch2=getchar();

/*if end search is selected, close display window and return to main menu*/
                if((ch2=toupper(ch2))=='E'){
                    OWEnd(1);
                    OWEnd(1);
                    fclose(fp);
                    break;}}

/*advise if search fails after first find and return to main menu*/
            if(x>count){
                if(y){
                    Clear(1);
                    CurXY(1,14,3);
                    puts("There are no more records.");
                    CurXY(1,14,5);
                    printf("Starting with the letter %c",ch);
                    CurXY(1,14,7);
                    printf("Press any key to continue.");
                    ch=getchar();

/*close display window*/
                    OWEnd(1);
                    OWEnd(1);
                    fclose(fp);
                    break;}

/*advise if search fails and return to main menu*/
                else {
                    Clear(1);
                    CurXY(1,6,3);
                    printf("There are no records");
                    CurXY(1,6,5);
                    printf("beginning with the letter %c",ch);
                    CurXY(1,6,7);
                    printf("Press any key to continue: ");
                    ch=getchar();
                    fclose(fp);
                    break;}}

/*start of list of all files in bbs database*/
/*close main menu window and open list window*/
/*does not use display for list*/
        case'3':OWEnd(1);
        OWEnd(1);
        OWSet(1,1,26,3,37,20,0,1);
        OWSet(1,1,28,4,33,18,0,2);
        y=0;

/*start of read and print to screen loop*/
        do {
            Clear(1);
            for(x=0;x<8&&y<count;x++){

```

```

            fread(&record,sizeof (struct base),1,fp);

/*<y> is incremented for reopening main window at top of main loop*/
            y++;
            if(strcmp(record.name,"??")){
                printf("\n %s\n",record.name);
                printf("\n Press any key to continue: ");
                ch=getchar();
            } while(y<count);

/*close display window and return to main menu*/
            OWEnd(1);
            OWEnd(1);
            break;
        }
    }while(ch!='4');
}

```

Listing 3: bbsen_del.c

```

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>

extern direct struct base{
    char name[15];
    char number[15];
    char location[25];
    char id[15];
    char pass[20];
}record;

extern direct struct tempo{
    char name[15];
    char number[15];
    char location[25];
    char id[15];
    char pass[20];
}temp;

bbsEnter(database)
char database[20]; {
    char ch;
    int count;
    int y,w=0;
    register int x;
    long z=(sizeof (struct base));
    FILE *fp;

    OWEnd(1);
    OWEnd(1);
    OWEnd(1);
    OWSet(1,1,3,1,23,3,0,1);
    OWSet(1,1,4,2,21,1,3,2);

    printf(" BBS ENTER FUNCTION");

    OWSet(1,1,5,6,52,16,0,1);
    OWSet(1,1,6,7,50,14,3,2);

/*start of main loop*/
    do {
        Clear(1);
        puts("\n Press <Enter> to abort\n");
        printf("\n Enter BBS name: ");
        FColor(1,0);
        x=readln(0,record.name,14);
        record.name[--x]=0;
        FColor(1,3);

/*test for abort*/
        if(!strcmp(record.name){
            OWEnd(1);
            OWEnd(1);
            OWEnd(1);
            OWEnd(1);
            return;}

/*convert to upper case to compare with existing records*/
        for(x=0;record.name[x];x++){
            record.name[x]=toupper(record.name[x]);

        if((fp=fopen(database,"r"))==NULL){
            Clear(1);
            printf("\nCannot access %s\n",database);
            printf("Press any key: ");
            ch=getchar();
            OWEnd(1);
            OWEnd(1);
            OWEnd(1);
            OWEnd(1);
            return; }

/*read the file count and search for open places from deleted records*/
        fread(&count,sizeof count,1,fp);
        for(x=0;x<count;x++){
            fread(&temp,sizeof (struct tempo),1,fp);

/*initialize y with x if open place is found. double ?? identify*/
/*location of space. w is 0 until space is found*/
            if(!w){
                if(!strcmp(temp.name,"??")){
                    y=x;
                    w++; }

/*search for existing record to prevent duplication*/
                if(!strcmp(temp.name,record.name)){
                    Clear(1);
                    CurXY(1,10,5);
                    printf(" %s already exists",record.name);
                    CurXY(1,10,7);
                    printf("Press any key to continue: ");
                    ch=getchar();
                    x=0;
                    fclose(fp);
                    break; }

```



```

/*begin entries after duplication search*/

if(x>count){
    printf(" Enter BBS phone number: ");
    FColor(1,0);
    x=readln(0,record.number,14);
    record.number[--x]=0;
    FColor(1,3);
    printf(" Enter BBS location: ");
    FColor(1,0);
    x=readln(0,record.location,24);
    record.location[--x]=0;
    FColor(1,3);
    printf(" Enter BBS entry I.D.: ");
    FColor(1,0);
    x=readln(0,record.id,14);
    record.id[--x]=0;
    FColor(1,3);
    printf(" Enter BBS password: ");
    FColor(1,0);
    x=readln(0,record.pass,19);
    record.pass[--x]=0;
    FColor(1,3);
    printf("\n DO you want to record entries?\n");
    printf("\n Y or <N>: ");

    if((ch=toupper(ch=getchar()))!='Y') {
        x=0;
        fclose(fp);
        break;}

/*if a deletion opening was found, seek the location and enter record*/

if(w)
    fseek(fp,((long) sizeof count)+(y*z),0);

/*if no deletion opening was found, increment and update count variable*/
/*and enter record at end of file*/

else {
    count++;
    rewind(fp);
    fwrite(&count,sizeof count,1,fp);
    fseek(fp,count*z,1);
    fwrite(&record,sizeof (struct base),1,fp);
    fclose(fp);}

Clear(1);
w=0;
CurXY(1,5,5);
puts("\n Do you want to make another entry?");
printf("\n <Y> or N: ");
ch=toupper(ch=getchar()); }

/*end of main loop*/

while(ch!='N');

OWEnd(1);
OWEnd(1);
OWEnd(1);

OWEnd(1);
return; }

bbsDelete(database)
char database[20]; {
    FILE *fp;
    char ch;
    char bbs[20];
    int count;
    register int x;
    long z=(sizeof (struct base));

    OWEnd(1);
    OWEnd(1);
    OWEnd(1);

    OWSet(1,1,3,1,22,3,0,1);
    OWSet(1,1,4,2,20,1,4,0);

    printf(" BBS DELETE SYSTEM");

    OWSet(1,1,3,8,60,7,0,4);
    OWSet(1,1,4,9,58,5,0,2);
    printf("\n Press <ENTER> to cancel\n");
    printf("\n Enter name of BBS to DELETE: ");
    x=readln(0,bbs,19);
    bbs[--x]=0;

/*test for abort*/

if(!*bbs){
    OWEnd(1);
    OWEnd(1);
    OWEnd(1);
    OWEnd(1);
    return; }

OWSet(1,1,7,12,60,7,0,4);
OWSet(1,1,8,13,58,5,0,2);

/*convert to upper case to compare name to records*/

for(x=0;bbs[x];x++){
    bbs[x]=toupper(bbs[x]);
    printf("\n READY TO DELETE %s -- PROCEED? <Y or N>: ",bbs);
    ch=getchar();
    if(ch=='Y'||ch=='Y'){
        if(!fopen(database,"r+")==NULL) {
            printf("Unable to access %s\n",database);
            printf("Press any key: ");
            ch=getchar();}

/*read count variable and record files*/

fread(&count,sizeof count,1,fp);
for(x=0;x<count;x++){
    fread(&record,sizeof (struct base),1,fp);

/*if a match is found, replace record name with double ?? causing the*/
/*program to ignore it--delete it.*/

if(!strcmp(bbs,record.name)){
    strcpy(record.name,"??");

```

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fseek(fp,((long) sizeof count)+(x*z),0);
fwrite(&record,sizeof (struct base),1,fp);
printf("\n Record DELETED:\n");
break;})

/*:if no message is found, send message and exit function*/

if(x>count)
    printf("\nThere is no record listed as %s\n",bbs);
fclose(fp);
printf(" Press any key: ");
ch=getchar();
OWEnd(1);
OWEnd(1);
OWEnd(1);
OWEnd(1);
OWEnd(1);
OWEnd(1);
OWEnd(1);
OWEnd(1);
return; }

```

Listing 4: bbsdis_ch.c

```

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>

extern direct struct base{
    char name[15];
    char number[15];
    char location[25];
    char id[15];
    char pass[20];
} record;

display(x,y)
int x;
int y;{

/*if y=0 then open windows for the display function*/
/*after first time through display(), y is more than 0*/

if(!y){
    OWEnd(1);
    OWEnd(1);
    OWSet(1,1,10,6,65,13,0,1);
    OWSet(1,1,11,7,63,11,0,2);
    Clear(1);
    FColor(1,3);
    printf("\n RECORD %d\n",x+1);
    printf(" 1) BBS= ");
    FColor(1,0);
    printf("%s ",record.name);
    FColor(1,3);
    printf(" 2) PHONE= ");

```

```

FColor(1,0);
printf("%s\n",record.number);
FColor(1,3);
printf(" 3) LOCATION= ");
FColor(1,0);
printf("%s\n",record.location);
FColor(1,3);
printf(" 4) LOGON I.D.= ");
FColor(1,0);
printf("%s ",record.id);
FColor(1,3);
printf(" 5) PASSWORD= ");
FColor(1,0);
printf("%s\n",record.pass);
y++;
return y; }

change(){
    char ch;
    char str[5][15];
    char str2[25];
    int x;

    strcpy(str[0], "Name");
    strcpy(str[1], "Phone Number");
    strcpy(str[2], "Location");
    strcpy(str[3], "I.D.");
    strcpy(str[4], "Password");

    /*force selection of 1 thru 5*/

    do{
        CurXY(1,0,9);
        ErLine(1);
        printf(" Select entry number to CHANGE <1 thru 5> ");
        ch=getchar();
        if(ch=='\n')
            return;
        while(ch<49||ch>53);
        CurXY(1,0,9);
        ErLine(1);
        printf(" Enter new BBS %s: ",str[ch-49]);
        gets(str2);

        switch(ch){
            case '1':for(x=0;str2[x];x++){
                str2[x]=toupper(str2[x]);
                strcpy(record.name, str2); break;
            case '2':strcpy(record.number, str2); break;
            case '3':strcpy(record.location, str2); break;
            case '4':strcpy(record.id, str2); break;
            default:strcpy(record.pass, str2); break;
        }
    }
    return;
}

```

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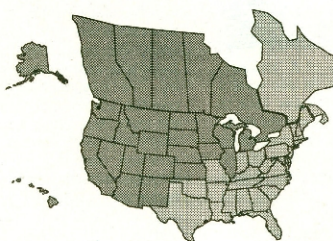
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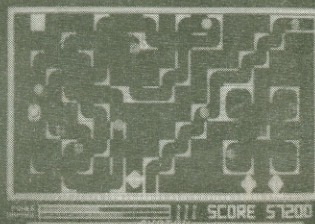
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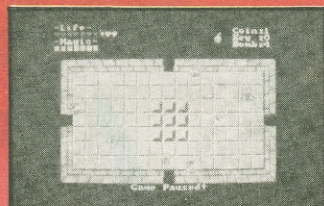
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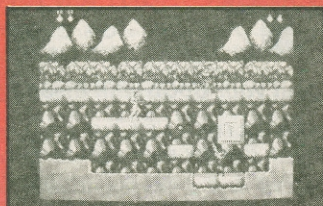
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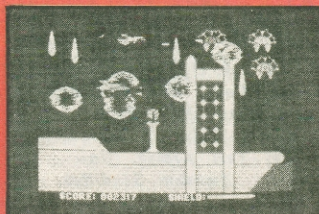
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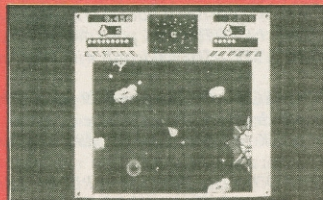
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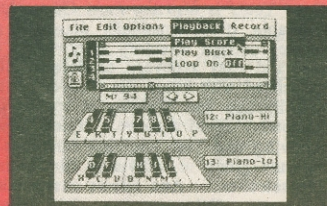
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